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Publications and Presentations Guide

Technical Information Division

Naval Undersea Warfare Center Division
Newport, Rhode Island

Publications and Presentations Guide

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Prepared by
Technical Information Division

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1176 Howell Street
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This Guide is a basic reference for the preparation and processing of technical reports, documents, manuals, memoranda, journal articles, brochures, pamphlets, and presentations at the Naval Undersea Warfare Center Division, Newport. It has two main purposes: (1) to establish common standards of communicating technical information and (2) to promote a common understanding among author, editor, and reviewer of the requirements and responsibilities that each type of technical publication imposes.

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PREFACE

This Publications and Presentations Guide was prepared by the Technical Information Division (Code 025) of the Command Support Department (Code 02) for the use of scientists, engineers, and administrative personnel in the preparation of publications and presentations for the Naval Undersea Warfare Center Division, Newport. This document establishes policy and guidelines for uniform format for a variety of technical information media.

The Technical Information Division gratefully acknowledges the efforts of all division personnel who contributed to this Guide through its many reviews and revisions, especially John J. Biagioni, William J. Conforti, and Efren D. Cruz, Publications Branch (Code 0251); Tracy L. Mallinson and Karen C. Delgado, Visual Information Branch (Code 0252); and Anna C. Mastan, Publications Branch (Code 0251), who served as chief editor for this Guide.

Reviewed and Approved: 8 March 1994

B. S. Holland
Commander, U.S. Navy
Head, Command Support Department

TABLE OF CONTENTS

TABLE OF CONTENTS (Cont'd)

LIST OF ILLUSTRATIONS

LIST OF TABLES

PUBLICATIONS AND PRESENTATIONS GUIDE

1. NUWC DIVISION NEWPORT PUBLICATION POLICIES

CHOOSING THE PUBLICATIONS CATEGORY

The principal publications at NUWC Division Newport include technical reports (TRs), technical documents (TDs), technical memoranda (TMs), journal articles, brochures and pamphlets, and technical manuals (see table 1-1). Authors should choose wisely the medium to best document and disseminate technical information by considering the publication in the context of the total situation in which it may eventually be used. (See specific section for definition of publication categories.)

After the category has been selected, the author should review the general publication policies given later in this section. The author should follow the specific publication/presentation requirements for content preparation, format, and release procedures. Although this guide is designed to answer most of the questions that an author, editor, or typist might have, the Publications Branch may be contacted for further direction or for issues that have not been addressed.

Policy requires that dual publication be avoided whenever possible. A case in point would be publication of a manuscript as a technical report and as a technical article in the *Navy Journal of Underwater Acoustics*. If an author believes that there is a good chance of having a manuscript accepted by a professional journal, the material should be prepared specifically with that purpose in mind. The author would not then publish the same material as a technical report, but instead would buy reprints and number and catalog them as reprint reports (see section 6). The only exceptions to the above would be a classified report from which an unclassified article could be prepared or a lengthy report from which a brief article could be prepared, or vice versa.

Generally speaking, it is not economical to duplicate a publication, because the two media usually have different audiences with different interests and backgrounds. A manuscript prepared specifically as a technical report usually does not make an effective technical article unless it is almost completely rewritten.

Table 1-1. Principal Technical Publications

Type	Content	Format	Distribution
Technical Report • Formal* publication • Documents NUWC Division Newport's position.	In-depth report on research, development, test, and evaluation phases of long-term program (investigative, analytical, theoretical)	NUWC-NPT TD 10,399; ANSI Z39.18; NUWC-DIVNPTINST 5200.4	Client (sponsor), cognizant government groups and laboratories, R&D community.
Technical Document • Formal publication • Documents NUWC Division Newport's position	Compilation of data; description of facility; summary of conference; bibliography; operating handbook; user's guide	Same as above.	Cognizant government groups and laboratories, R&D community.
Technical Memorandum • Informal publication • Documents NUWC Division Newport's position only if officially endorsed.	Communication on day-to-day operations or short-range project; work proposal or quick response to outside sponsor; professional comment to R&D community	NUWC-NPT TD 10,399; NUWC-DIVNPTINST 5602.1	Principally internal; external if department head approves.
Technical Article • Formal publication • Provides forum for author	Article in professional journal or trade magazine on technical subject of general interest.	Specification of journal or magazine.	Scientific and technical community
Brochure and Pamphlet • Formal publication • Promotes NUWC Division Newport's capabilities	Descriptive announcement of availability of special service or facility; treatment of subject of special interest.	NUWC-NPT TD 10,399; SECNAVINST 5600.20	General public and private sector
Technical Manual • Formal publication • Documents Navy position	Instruction on installation, operation, maintenance, repair, and parts support of systems and equipment.	MIL-M-15071 MIL-M-38784 NAVSEAINST 4160.3	Fleet personnel

*The terms "formal" and "informal" are arbitrary terms relating to the purpose, format, and distribution of a publication. Thus, they designate the general standards required for preparation and processing.

OFFICIAL NAVY EMBLEM

The official Navy emblem shown on the front cover of this document is established in SECNAV Instruction 5600.20. This emblem is the only symbol to be printed on the cover (or first page) of a formal publication to identify it as a Department of the Navy publication and to indicate its official character. The use of other seals, logos, or emblems is prohibited.

METRIC SYSTEM OF MEASUREMENTS*

The Department of Defense (DoD) requires that reports, studies, and position papers include metric units of measurement in addition to or in lieu of U.S. customary units. This policy is to be followed for all technical publications except those pertaining to items dimensioned in U.S. customary units. With respect to contracts, this requirement applies only if such documentation can be obtained without an increase in contract costs. Exceptions to the requirement may be made only with the approval of the head of the department in which the principal author is located. The International System of Units (SI), described in ASTM E 380-82 or successor documents listed in the DoD Index of Specifications and Standards, will be the metric system used.

The use of dual dimensions (i.e., both metric and U.S. customary) on drawings will be avoided unless it is determined in specific instances that such usage will be beneficial. However, the use of a table to translate dimensions from one system of measurement to the other is acceptable.

COPYRIGHTED MATERIAL

Copyrighted material will not knowingly be included in publications or other works of the Department of the Navy without the consent of the copyright owner or approval of the Secretary of the Navy or his duly authorized representative. For this purpose, the duly authorized representative of the Secretary is the Chief of Naval Research or his designee. SECNAV Instruction 5870.5 outlines the procedures to be followed in obtaining permission for the use of copyrighted material. The Technical Information Division will coordinate these requests.

When copyrighted material must be used in a publication, a copyright permission notice shall be included showing that permission has been obtained. The wording of the notice will be as shown in the following example (unless other specific wording has been requested by the copyright holder):

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* A metric conversion table is provided in section 8.

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When the copyrighted material is an illustration, the permission notice is generally placed immediately beneath the illustration (above the illustration's caption). When the copyrighted material is text or tabular matter, the permission notice is generally set as a footnote on the page, keyed by asterisk to the pertinent material.

A publication prepared by an employee of the U.S. Government as part of that person's official duties cannot be copyrighted. Therefore, a government employee cannot sign a document that claims or transfers a copyright. When a transfer of rights is requested, most publishers will have a place on their form where a Government employee can certify that the work is that of the U.S. Government and is not protected by a U.S. copyright. If the form does not contain a waiver statement, the following statement should be typed on the form and signed by the author:

It has been determined that the above entitled paper is the work of the United States Government under the provisions of Title 17, Section 105, of the U.S. Code and, therefore, in the public domain. Accordingly, there is, by law, no copyright which may be assigned.

When a publication is not copyrighted, protocol requires that credit for its use be given to the originator. If a noncopyrighted publication is extensively quoted by an author, it is recommended that written permission for its use be obtained.

DISTRIBUTION STATEMENTS

The use of these statements is intended to permit a wider distribution of technology inside the defense community and a more selective dissemination outside of it. See section 2 for guidance in the use of these statements.

SECURITY MARKINGS FOR CLASSIFIED PUBLICATIONS

OPNAV Instruction 5510.1 *The Department of the Navy Information Security Program Regulation*, and NUWCDIVNPT-INST 5500.4, the *NUWCDIVNPT Security Manual*, describe the security requirements for all technical publications. Section 2 of this document explains the use of security markings.

PRINTING

Most technical publications issued from NUWC Division Newport are printed or reproduced by the Defense Printing Service Detachment Office (DPSDO) in accordance with NAVSO P-35, *Department of the Navy Publications and Printing Regulations.* No more than five copies of a publication may be provided by an outside source (see NUWCDIVNPTINST 5604.1, *Procurement of Printing Services Resulting from Contracts*).

Technical publications are submitted for printing to DPSDO by the Publications Branch.* (When printing is complete, authors are responsible for external distribution.)

NUWC Division Newport publications are ordinarily printed on 60-pound white paper with black ink and are bound with two or three staples on the left side. Printing in more than one color of ink and the use of reverse images, tint blocks, index tabs, or special papers and bindings must receive prior approval by DPSDO. Multicolor printing is permitted for special-use documents (e.g., brochures, pamphlets, ceremonial programs) or for technical clarity.

DPSDO provides a comprehensive range of resources and services. A few of them are

Consultation -- Assistance in planning, preparing, layout, and designing forms and publications; advice on electronic interface requirements and capabilities and other printing-related services and products.

Composition -- Various composition, copy preparation, image scanning, and related design services, including setting type by electronic character generating systems.

Printing -- Reproduction and printing of forms, publications, brochures, books, manuals, etc. Also, a complete range of bindery and finishing services.

SECONDARY DISTRIBUTION

After the primary or initial distribution of a publication, external requests for secondary distribution of NUWC Division Newport publications on file with the Defense Technical Information Center (DTIC) are generally referred to DTIC; internal requests will be referred to the NUWC Division Newport Library or the NUWC Detachment New London Library. External and

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*A secret control number must be obtained from the NUWC Division Newport or Detachment New London Documents Library before any secret publication or graphic may be reproduced.

internal requests for publications not sent to DTIC (e.g., TMs) will be processed through the NUWC Division Newport Library.

NON-NUWC AUTHORSHIP

NUWC Division Newport publications may not be solely authored by non-NUWC persons (e.g., consultants, contractors). However, coauthorship with NUWC is permissible. In such cases, the NUWC author(s) usually will be listed first on the cover and the affiliation of each author will be shown; for example,

J. A. Smith
R. L. Brown
Combat Control Systems Department

T. O. Jones XYZ Corporation	or	T. O. Jones Consultant to Combat Control Systems Department

Non-NUWC coauthorship should be limited to those cases where true collaborative writing has taken place between the NUWC author and the outside author.

For documents solely written by non-NUWC persons (e.g., contractors) in "works-made-for-hire" situations,* authorship will be credited to the contracting NUWC Department. If desired, the efforts of the *true author* may be acknowledged in the preface or administrative information of the report.

* The term "works made for hire" refers to works the Government has commissioned and paid someone to write. The completed work belongs to the Government. If the Government then decides to publish such a work, the hired author has no claim to authorship.

2. SECURITY GUIDELINES

CLASSIFICATION CATEGORIES

Executive Order 12345, *National Security Information,* established three categories of classified information, i.e.:

Top Secret

Top Secret shall be used for information or material that could reasonably be expected to cause exceptionally grave damage to national security if unauthorized disclosure is made. Some examples of Top Secret information are sensitive intelligence operations and scientific or technological developments vital to national security.

Secret

Secret shall be used for information or material that could reasonably be expected to cause serious damage to national security if unauthorized disclosure is made. Some examples of Secret information are significant scientific or technological developments affecting national security.

Confidential

Confidential shall be used for information or material that could reasonably be expected to cause damage to national security if unauthorized disclosure is made. Some examples of Confidential information are performance characteristics, test data, and technical information used for training.

It is the responsibility of the author to consult security guidelines to determine the proper classification category.

OVERALL MARKINGS

Every page of a classified publication shall bear the overall security classification marking of the publication. Page markings are normally set in 18- or 24-point bold capitals (centered top and bottom). A confidential report will have all its pages marked CONFIDENTIAL and a secret report will have all its pages marked SECRET, except as described below.

Major components (i.e., appendixes or supplements) of a complex document that can be used separately and independently of the other material will be marked as individual documents. If an

unclassified appendix appears in a confidential or secret publication, its first page may be marked UNCLASSIFIED top and bottom and individual items need not be marked. In such a case, the following note will be placed beneath the appendix title:

NOTE: All portions of this appendix are UNCLASSIFIED.

If a confidential appendix appears in a secret publication, its pages may be marked CONFIDENTIAL, but all of its individual items must be appropriately marked.

COVER MARKINGS

Color Coding

To aid in distinguishing classified from unclassified publications and the degree of classification assigned, the covers of all publications are color coded. The following colors are standard for NUWC Division Newport: white for unclassified, green for confidential, yellow for secret, and pink for top secret.

Classification Markings

The overall classification marking (CONFIDENTIAL, SECRET, or TOP SECRET) of the publication must appear at the top and bottom of the front and back covers and the appropriate symbol ((U), (C), (S), or (TS)) must follow the title (see sample cover in section 3).

Classification Authority and Declassification Information

All classified material must be marked with the classification authority and the declassification information on the lower face of the publication (i.e., cover, title page, or first sheet), as specified in OPNAV Instruction 5510.1 and as shown on the sample covers in this Guide.

1. The first (or "Classified by") line indicates the security classification guide (see OPNAV Instruction 5510.1), source document, or other authority used for classification. If more than one guide/source is used, the words *Multiple Sources* are inserted.

2. Executive Order 12356 states that the original classification authority must classify information for as long as required by national security considerations. Thus, the second (or "Declassify on") line will indicate either a specific date or event that is certain to occur or, if the classification guide does not show such a date or event, will read OADR (originating agency's determination required). When multiple sources are used, the declassi-

fication date with the longest duration will be shown. The file copy (original) will list the actual classification guides that apply.

3. The "Downgrade to" line (in addition to the first and second lines) is used only when downgrading instructions are applicable. The marking SECRET or CONFIDENTIAL and the specific date are shown in the "Downgrade to" line.

Foreign and Intelligence Control Markings

When foreign government (or NATO) information is used in a NUWC Division Newport publication, the cover will state THIS DOCUMENT CONTAINS FOREIGN GOVERNMENT (or NATO) INFORMATION. Paragraphs will then be appropriately marked as (UK-C), (AUS-S), (CAN-C), (NATO-S), and so forth. If a document contains intelligence information that might compromise the status of relations with collaborating foreign governments or officials, the front cover and the first right-hand page will state NOT RELEASABLE TO FOREIGN NATIONALS. (This marking is abbreviated NOFORN or NF.) If a document contains the source or method involved to collect intelligence information, the front cover will carry the following notice:

WARNING NOTICE: Intelligence sources or methods involved.

This notice is abbreviated WNINTEL or WN. For documents involving NOFORN or WNINTEL information, the appropriate paragraphs, titles, headings, etc., will be marked (C-NF), (S-NF), (C-NF-WN), or (S-NF-WN) and any affected table or illustration will be marked CONFIDENTIAL-NOFORN, SECRET-NOFORN, CONFIDENTIAL-NOFORN-WNINTEL, or SECRET-NOFORN-WNINTEL in the usual table/figure classification location. Any page carrying NOFORN or WNINTEL information will be marked as follows:

The upper page marking (centered) will be, as appropriate, CONFIDENTIAL-NOFORN or SECRET-NOFORN or , CONFIDENTIAL-NOFORN-WNINTEL or SECRET-NOFORN-WNINTEL. The lower page marking will be as usual (i.e., simply CONFIDENTIAL or SECRET).

In summary, the marking requirements for NOFORN or WNINTEL documents are as follows:

1. The full, spelled-out intelligence control marking (all capitals, 10- to 12-point type) is used at the bottom of the front cover and the first right-hand page of the publication (SF Form 298 in TRs/TDs, Abstract page in TMs).

2. The short form (NOFORN, WNINTEL) is added to the upper page classification on each affected page (e.g., SECRET-

NOFORN or SECRET-NOFORN-WNINTEL). This short form is also used for figure and table classifications.

3. The abbreviated form (NF, WN) is used for portion marking (e.g., (S-NF) or (S-NF-WN)).

Compilation Classification Markings

For a classified document with no single classified item, a classification notice explaining the reason for the classification will be placed on the front cover. The notice must include (1) the fact that the individual parts are of a lower classification, (2) the reason the compilation warrants a higher classification, (3) the authority for classifying. For example,

> *CLASSIFICATION NOTICE: No single item of information in this document is classified by itself. However, because the compilation of these items deals with* ... (insert reason for the higher classification) ... , *the overall document is classified CONFIDENTIAL in accordance with* ... (insert appropriate authority and downgrading).

In such documents, all pages are to be marked CONFIDENTIAL, but no individual paragraphs, illustrations, tables, headings, etc., need be marked.

FRONT MATTER

The preface, executive summary, table of contents, list of illustrations, list of tables, list of abbreviations and acronyms, and foreword must be appropriately marked in a classified publication (see section 3).

The classification of all headings, captions, and titles will be indicated in all front matter.

PORTION MARKINGS

Each portion of the text (headings, paragraphs, subparagraphs, table and illustration captions, and footnotes) of a classified publication must be marked to show its level of classification ((U), (C), (S), (TS)).

Headings

Classification markings for unnumbered or unlettered headings will immediately follow the heading. All run-in headings will be preceded by the appropriate classification marking; this marking applies to both the heading and the following text (see figure 3-13).

Classification markings for numbered or lettered headings will immediately follow the number or letter (see figure 3-14).

Paragraphs

All unnumbered or unlettered paragraphs will be marked with their appropriate classification marking placed flush-left. Classification markings for numbered or lettered paragraphs will be placed after the number or letter (figure 3-14).

A portion of a paragraph continued from a preceding page requires no marking.

Short phrases or incomplete sentences that appear as numbered or lettered items or steps under a paragraph will not be individually marked but will assume the classification of the parent paragraph. However, complete sentences presented in this manner will be individually classified unless they and the parent paragraph are unclassified.

Illustrations and Tables

The classification marking for an illustration (all capitals, 10- or 12-point bold) will appear beneath the illustration, and the classification of the caption will appear between the illustration number and the caption.

The classification marking for a table will appear beneath the table, and the classification of the table title will appear between the table number and title. Footnotes to tables do not require a separate classification.

The classification of abbreviation lists, glossaries, indexes, lists of programming code, etc., will be shown in the same manner as for a figure or table.

Text Footnotes

Classification markings for footnotes will be placed flush-left as is done for unnumbered text paragraphs.

END MATTER

Reference Page and Bibliography

The heading for the reference or bibliography page is marked as unclassified and each reference or bibliography entry is marked

separately. In a classified reference, each reference title must be marked (see figure 3-10).

Classified references or references with limited distribution should not be cited in a publication approved for public release.

Back Cover

The back cover of a NUWC Division Newport publication is blank except for the necessary classification markings. Classification markings are shown in the same manner as on the front cover.

The last page (i.e., the left-hand page facing the back cover) of every classified publication will usually be marked with the overall security classification, even if it is blank.

DISTRIBUTION STATEMENTS

The policy of the DoD regarding the distribution of classified and unclassified technical publications requires that the covers or title pages of all such publications be assigned one of the distribution statements listed in table 2-1.* NUWCDIVNPTINST 5600.1 is to be used as a guide to implement procedures for the distribution, release, and dissemination of defense technical documents originated at or for this command.

Statement A: Release of Unclassified Information to the General Public

When an unclassified publication is released to the public at large, it must carry statement A and is subject to internal review by cognizant Division personnel. The material is first reviewed by the author before it is sent to the technical reviewer, department head, OPSEC specialist and security officer, Code 10, and public affairs officer (figure 2-1). However, certain specified areas of unclassified technical information must still be submitted by the security officer to higher authority for clearance before public release:

1. Information of national interest that will draw the attention of Congress or the general public.

2. Information originated at or proposed for release at the seat of the Government.

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* Sample covers carrying distribution statements are shown in section 3.

Table 2-1. Distribution Statements

	Statement	Reasons for Applying Statement*
A	Approved for public release; distribution is unlimited.	• Cleared for public release by competent authority.
B	Distribution authorized to U.S. Government agencies only; (reason); (date of determination). Other requests for this document shall be referred to (controlling DoD office).	• Foreign Government Information. • Proprietary Information • Critical Technology • Test and Evaluation • Contractor Performance Evaluation • Premature Dissemination • Administrative or Operational Use • Software Documentation • Specific Authority
C	Distribution authorized to U.S. Government agencies and their contractors only; (reason); (date of determination). Other requests for this document shall be referred to (controlling DoD office).	• Foreign Government Information • Critical Technology • Administrative or Operational Use • Software Documentation • Specific Authority
D	Distribution authorized to the Department of Defense and U.S. DoD contractors only; (reason); (date of determination). Other requests for this document shall be referred to (controlling DoD office).	• Foreign Government Information • Critical Technology • Administrative or Operational Use • Software Documentation • Specific Authority
E	Distribution authorized to DoD components only; (reason); (date of determination). Other requests for this document shall be referred to (controlling DoD office).	• Direct Military Support • Foreign Government Information • Proprietary Information • Critical Technology • Test and Evaluation • Contractor Performance Evaluation • Premature Dissemination • Administrative or Operational Use • Software Documentation • Specific Authority
F	Further dissemination only as directed by (controlling DoD office), (date of determination), or higher DoD authority.	• Normally used only on classified documents; may be used on unclassified documents when specific authority exists.
X	Distribution authorized to U.S. Government agencies and private individuals or enterprises eligible to obtain export-controlled technical data in accordance with DoD Directive 5230.25 (date of determination). Controlling DoD office is (insert).	• Used on an unclassified document when statement B, C, D, E, or F does not apply, but the document contains technical data as explained in DoD Directive 5230.25. Not used on classified documents.

*See page 2-10 for explanation of "reasons."

ROUTING SHEET FOR RELEASE OF UNCLASSIFIED TECHNICAL INFORMATION
NUWCDIVNPT 5216/9 (REV. 3-92)

APPLICABLE CLASSIFICATION GUIDE(S)
(SEE ITEM 8 BELOW)

TITLE OF PROPOSED RELEASE — DATED

TYPE OF INFORMATION (PRESENTATION, ARTICLE, REPORT, ETC.)

INTENDED FOR PUBLICATION IN/PRESENTATION AT

BRIEF STATEMENT OF PURPOSE OF RELEASE

	Originator		Technical Reviewer		Dept. Head		OPSEC		Code 10		Security	
TO THE BEST OF YOUR KNOWLEDGE, IS PROPOSED RELEASE :	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
1. TECHNICALLY ACCURATE?												
2. FREE OF CRITICAL MILITARY TECHNOLOGY?												
3. FREE OF INFORMATION WITH POTENTIAL INTELLIGENCE VALUE?												
4. FREE OF INFORMATION THAT WOULD ADVERSELY AFFECT THE SECURITY OF THE U.S.?												
5. CONSIDERED BORDERLINE FROM BEING CLASSIFIED?												
6. CLASSIFIED WHEN ASSOCIATED WITH A KNOWN PREVIOUS RELEASE?												
7. LIABLE TO DAMAGE THE SUCCESS OR OPERATION OF A SYSTEM?												
8. SECURITY CLASSIFICATION GUIDES CONSULTED TO ENSURE NO CLASSIFIED OR "FOR OFFICIAL USE ONLY" INFORMATION? (APPLICABLE GUIDE(S) TO BE NOTED AT TOP OF SHEET.)												

ROUTING (NAME AND CODE)	SIGNATURE AND DATE	REMARKS
AUTHOR / ORIGINATOR		
TECHNICAL REVIEWER		
DEPARTMENT HEAD		
OPSEC		
CODE 10		
SECURITY OFFICER		
PUBLIC AFFAIRS OFFICER	☐ APPROVED ☐ DISAPPROVED	APPROVED STAMP (IF APPLICABLE)

Return to:

Figure 2-1. Routing Sheet for Public Release Approval (i.e., releasing unclassified information to the general public)

3. Information concerning foreign and military policy; guided missiles; chemical, biological, and radiological warfare; high energy lasers; weather modification; surface effects ships; new weapon systems; environmental protection; pollution abatement; Trident; Poseidon; Polaris; and antisubmarine warfare.

4. Information concerning subject areas of potential controversy among the military services.

5. Material concerning significant policy within the purview of other agencies of the Federal Government.

6. Other information specifically designated from time to time by the Chief of Naval Operations, or higher authority, as requiring clearance.

7. Naval nuclear propulsion information, classified and unclassified. (This information is specifically prohibited from public release and shall not be handled in any manner that could result in direct or indirect release to the public.)

NUWCDIVNPTINST 5570.1 is to be used as a guide for public release documents. The Publications Branch, Public Affairs staff, or the Security Division may be contacted for assistance in obtaining public release approval.

One requirement that authors often overlook is that all references in technical publications for public release must be available to the general public. Publications citing references that are classified or are marked with a limited distribution statement cannot be released to the public-at-large.

Statements B Through X: Distribution Limitations on Classified and Unclassified Information

Distribution statements B through X are used to control the distribution of all classified publications and those unclassified publications that are not released to the public-at-large. Distribution statement X is generally used on unclassified documents when distribution statements B through F do not apply, but the document does contain technical data.

Two requirements that authors often overlook when preparing a limited distribution publication are that (1) all working papers must be appropriately marked or stamped, and (2) each classified reference must be properly identified.

Restrictions on the Use and Dissemination of Commercial Information

Information from a private source with a restriction on use or dissemination shall not be incorporated in NUWC Division Newport publications unless accompanied by a notice of restriction. Publications containing such information will be marked with statement B or E as follows:

Statement B:

Distribution authorized to U.S. Government agencies only; Proprietary Information; (date of determination). Other requests for this document shall be referred to the Naval Undersea Warfare Center Division, Newport, RI.

Statement E:

Distribution authorized to DoD components only; Proprietary Information; (date of determination). Other requests for this document shall be referred to the Naval Undersea Warfare Center Division, Newport, RI.

Normally, such information will be included only with the written permission of the proprietor of the data. Questions concerning the validity and scope of the restrictions imposed by private organizations may be referred to the Patent Counsel for resolution. Under no circumstances will publications containing restricted information be given unlimited distribution. Responsibility for ensuring that restricted information is marked properly rests with the author of the publication.

Reasons for Applying Distribution Statements

If there is any doubt as to the distribution statement or the reason for applying such a statement, consult the Security Division. Reasons for assigning various distribution statements are as follows:

Foreign Government Information. To protect and limit distribution in accordance with the desires of the foreign government that furnished the technical information. Information of this type is normally classified at the confidential level or higher.

Proprietary Information. To protect information not owned by the U.S. government and protected by a contractor's limited rights statement or received with the understanding that it not be routinely transmitted outside the U.S. Government.

Critical Technology. To protect information and technical data that advance current technology, describe new technology in an area of significant or potentially significant military application, or relate to a specific military deficiency of a potential adversary. Information of this type may be classified or unclassified; when unclassified it is controlled by the export laws and subject to the provisions of DoD Directive 5230.25.

Test and Evaluation. To protect the results of test and evaluation of commercial products or military hardware when such disclosure may cause unfair advantage or disadvantage to the manufacturer of the product.

Contractor Performance Evaluation. To protect information in management reviews, records of contract performance evaluation, or other advisory documents evaluating contractor programs.

Premature Dissemination. To protect patentable information on systems or processes in the developmental or concept stage from premature dissemination.

Administrative or Operational Use. To protect technical or operational data or information from automatic dissemination under the International Exchange Program or by other means. This protection covers publications required solely for official use or strictly for administrative or operational purposes. This statement can be applied to manuals, pamphlets, technical orders, technical reports, and other publications containing valuable technical or operational data.

Software Documentation. To be released only in accordance with the provisions of DoD Instruction 7930.2.

Specific Authority. To protect information not specifically included above, but which requires protection in accordance with valid documented authority such as executive orders, classification guidelines, or DoD or DoD component regulatory documents. When filling in the reason, cite "specific authority (identification of valid documented authority)."

Direct Military Support. To protect information that is export-controlled technical data of such military significance that release for purposes other than direct support of DoD-approved activities may jeopardize an important technological or operational military advantage of the U.S. Designation of such data is made by competent authority in accordance with DoD Directive 5230.25.

Additional Notices

In addition to the distribution statement, publications containing export-controlled data must carry the following warning on the cover:

> *WARNING: This document contains technical data whose export is restricted by the Arms Export Control Act (Title 22, U.S.C., Sec 2751, et seq.) or the Export Administration Act of 1979, as amended, Title 50, U.S.C., App. 2401, et seq. Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25.*

3. TECHNICAL REPORT (TR) AND TECHNICAL DOCUMENT (TD)

INTRODUCTION

This section of the Guide

- Defines the contents of a TR and a TD,
- Provides a description of TR and TD preparation and release procedures, and
- Establishes the NUWC Division Newport standards for TR and TD formatting and style.

These guidelines incorporate many of the provisions of ANSI Standard Z39.18 and NUWCDIVNPTINST 5200.4.

CONTENT

Technical Report

A TR is a publication that reflects the thinking and records the official position of NUWC Division Newport on a particular subject. It is used to convey information on its research, development, test, and evaluation activities. Generally, a TR is investigative, analytical, or theoretical in nature and, thus, logically contains conclusions and offers recommendations. It is of interest not only to the client (the department, agency, or command sponsoring the work) but also to cognizant government groups and laboratories. A TR, therefore, constitutes one of the principal means of in-depth reporting on technical subjects to the outside world. The following criteria identify material appropriate for a TR:

1. Material that reports on or summarizes a completed project, when the results are potentially of value to more than a few individuals outside NUWC Division Newport.

2. Material that reports on completed phases of a project, when such reports are comprehensible in themselves and make it possible to avoid having a single, extremely long, unwieldy final report.

3. Material that reports on completed phases of lengthy projects, when such reports will provide information of value to authorized persons outside NUWC Division Newport and when the timeliness of such information is important.

4. Material not covered previously that constitutes a complete and clear treatment of a subject area potentially of value to authorized persons outside NUWC Division Newport.

5. Material that is valuable in providing perspective in looking at complicated projects or subject areas.

6. Proposals that are sufficiently important and carefully enough prepared to bring credit to their authors and to NUWC Division Newport.

Technical Document

Similar to a TR, a TD is a publication documenting the official position on a particular subject. Unlike TRs, however, TDs vary widely in purpose and function. For example, they include publications that are essentially a compilation of data; publications such as brochures that describe facilities; summaries of the proceedings of conferences and symposia; bibliographies; and operating handbooks.

Generally, the choice of whether to publish material as a TR or as a TD is clear. However, when in doubt, authors should consult the Publications Branch.

OVERALL PREPARATION AND RELEASE PROCEDURES

After the author chooses to publish a manuscript as a TR or TD, the process of bringing the publication from its initial conception to its final distribution involves several stages:

1. Preparation of a draft of the manuscript by the author. Review and polish of the preliminary draft to present the author's best effort.

2. Review and publication approval of the draft by the cognizant branch head, division head, and department head (or director).

3. Detailed analysis of the draft for technical coverage and accuracy by a technical reviewer (if required).

4. Editing of the draft and preparation of final copy by the Publications Branch, or review of contractor-prepared publications. (The TR or TD number is assigned at this time.)

5. Final review and approval by the author and the cognizant department head (or director).

6. Publication and distribution by the Publications Branch of the Technical Information Division.

Figure 3-1 shows the flow of the manuscript from one stage to the next. The responsibilities of the author and of each reviewer are described under the following subheadings.

Author's Role

When authors originate a TR or TD, they become reporters on assignment for the branch, division, and department in which they work and for NUWC Division Newport as a whole. Thus, people at higher levels in the organization have the right (and duty) to review what the authors say, and ask for revisions if they believe the content is inaccurate or the emphasis is inconsistent with the objectives and standards of their respective organizational groups.

As the prime movers of publications, authors are responsible not only for the initial inputs but also for revisions to those inputs. Authors are also responsible for consulting applicable security guidelines for determining the appropriate classification and distribution statements.

Role of Branch Head and Division Head

The branch head and the division head serve as sponsors and first-line critics of any formal publication originated by those under their aegis. As sponsors, they have the responsibility to help the author produce a meaningful, intelligible publication within a specified time. It must be meaningful in that it must relate to the purposes and interests of NUWC Division Newport, the Navy, and the client or reader. It must be intelligible in that it must communicate within a context that the reader can readily understand. It must be completed on schedule; otherwise, its impact and usefulness might be lost.

The branch head (usually the author's technical supervisor) is responsible for checking the technical coverage of the message to ensure that it is technically complete before it goes to other reviewers. The branch head also should help the author determine whether a security classification is necessary and, if so, what classification is appropriate.

The division head should concentrate on checking the logic of whatever conclusions and recommendations the author may have drawn from the technical data presented. It is also important at this stage in the publication process to determine whether the content agrees with or contradicts any viewpoints or policies in the chain of command through which the publication must pass. The division head is in an excellent position to perform this initial screening.

In summary, the branch head and the division head form a front-line reviewing team. All reports that pass their review have

Step 1
Author forwards draft with memo through channels to Department Head or higher authority.

↓

Step 2
If technical review is required, Department Head (or higher) assigns a Technical Reviewer and forwards draft. If technical review is not required, Department Head forwards draft to Publications Branch for edit (see step 5).

↓

Step 3
Technical Reviewer reads document and meets with author to resolve any questions; if necessary, consults with higher authority.

↓

Step 4
After questions are resolved, Technical Reviewer completes review. Returns draft to author.

↓

Step 5
Publications Branch gives draft a TR or TD number and assigns it to an editor. When edit is complete, editor confers with author and any problems are resolved.

↓

Step 6
Final review copy is prepared and forwarded via author to Department Head or higher authority for prepublication review and approval. (Documents for public release must also follow procedure of NUWCDIVNPTINST 5570.1.)

↓

Step 7
Editor makes changes if needed; has copy reviewed by Security Office; and arranges for printing and distribution.

Figure 3-1. Flowchart for Processing a TR or TD

been given a preliminary check for coverage and policy and are ready for detailed scrutiny by the technical reviewer (if required) and the technical editor.

Technical Reviewer's Role

This review procedure is designed to ensure publication quality by providing for objective technical reviews by subject matter specialists. Such reviews are not a substitute for those expected of line management; rather, they help to strengthen management's role in this important area of responsibility. Although this procedure applies primarily to TRs, it may be invoked for any TD, journal article, or technical memorandum if the information is important enough to warrant such review or if the information is being cleared for public release.

Technical reviewers share responsibility with authors for ensuring that advances in technology detailed in R&D reports are properly safeguarded and that the nation's technological advantage is not compromised, especially those advances in technology that affect vital national interests. Note that the author must attach copies of all applicable classification authorities to publications requiring technical review.

The technical reviewer is expected to fulfill the following specific responsibilities:

1. Read the publication critically to ensure a reasonable presentation based on a solid technical foundation.

2. Examine hypotheses and methodology in relation to known scientific and engineering principles.

3. Examine the conclusions and recommendations made by the author in light of the investigation and the resulting data, as well as in light of the data obtained by other investigators referenced in the publication.

4. Certify the technical accuracy and adequacy of the information. (The technical reviewer is not expected to repeat the investigative and analytical work required for complete verification.)

5. Review critically the security classification assigned to each part of the publication and to the publication as a whole in light of the attached classification criteria, keeping in mind the need to safeguard those advances in technology detailed in R&D publications that may affect national security.

6. Review critically the limitation placed on distribution of the publication.

7. Resolve any disagreements or problem areas directly with the author.

8. Complete the technical review within two weeks; otherwise, notify the author and department head of any delay.

9. Return the publication to the author with appropriate comments.

Editor's Role

The Publications Branch is a services group. Its editors are professionals trained in every phase of preparing government technical publications. Their backgrounds include familiarity with the latest standards and specifications for various types of technical communications, including standards, specifications, and directives of the Department of Defense (DoD), the Department of the Navy, and the Naval Sea Systems Command.

It is the first responsibility of the editor to see to it that the assigned TR or TD meets the pertinent standards and specifications in regard to content, organization, language, grammar, etc. The editor also follows the publication through the review and release stages, keeping the author informed of its status.

For a classified publication, the editor ensures that the required overall security and classification designations are provided by the author; that each paragraph, illustration, and table is marked according to its security classification; and that distribution limitations are imposed, as necessary.

Role of Final Reviewers

Every TR and TD is a NUWC Division Newport product bearing the official Navy emblem. The policy of requiring that official communications be reviewed and approved by those in positions of responsibility is, therefore, logical and reasonable.

Review and approval for publication by the concerned department head or director are not mere formalities. Every publication is different -- in content, in purpose, in audience. Quality control, therefore, cannot be handled by batch sampling; every publication must be read and judged individually.

Department heads or directors possess certain information not available to those at lower echelons (e.g., information that cannot always be exposed to wider circulation). Consequently, the final reviewers bring a viewpoint to the reading that differs from that of the other members of the publications team. They also, of course, have broader responsibilities than their teammates. As final

reviewers, they must ensure that the publication contains no violations of official NUWC and Navy policy, that the current thinking of the Division is correctly represented, and that the timing of the publication will not jeopardize the chances for a favorable reception of the publication or interfere with other projects underway or planned. Their opinions also are helpful in that these officers are familiar with the interests and backgrounds of their counterparts at other centers, laboratories, commands, and departments of the Navy, and, therefore, they can help authors determine whether or not their publications will meet specific reader needs.

Once the final routing sheet (figure 3-2) has been signed by the appropriate reviewers, the signature of the department head or director on the preface page of the final copy indicates approval to publish and distribute.

FORMAT

Order of Elements

Individual elements of NUWC Division Newport TRs are listed below in their order of appearance.

Front Matter	Front Cover*
	Back of Front Cover (Preface)*
	Report Documentation Page (SF 298)*
	Executive Summary
	Table of Contents*
	List of Illustrations
	List of Tables
	List of Abbreviations and Acronyms
	Foreword
Body	Introduction*
	Presentation of Evidence*
	Conclusions or Summary*
	Recommendations
End Matter	References†
	Bibliography†
	Appendix(es)
	Distribution List*
	Back Cover*

* Required in all technical reports.

† In certain circumstances, the references and bibliography can follow the appendixes (see page 3-19).

UNCLASSIFIED

MANAGEMENT REVIEW ROUTING SHEET

From:				Date:
ROUTING	**ACTION**	**DATE**	**INITIALS**	
1				
2				
3				**Action Symbols:**
4				A - For Approval
5				B - For Approval and Signature
6				C - Security Review
7				D - Classified Control
8				
9				
10				

Report No.: **Title:**

Author(s):

Classification: UNCLASSIFIED

Note to Reviewers

A distribution list for this report/document is enclosed with this manuscript. The report will be distributed solely on the basis of management's review of this list. It is therefore imperative that the list be carefully reviewed by all levels of management to avoid possible embarrassment by the omission of key Navy activities or codes who have an interest in the report or, conversely, by the unwarranted inclusion of large numbers of addressees.

UNCLASSIFIED

Figure 3-2. Final Routing Sheet for a TR or TD

[Note that the overall classification of the document is centered top and bottom (all capital letters) on the final routing sheet.]

Because there are many kinds of TDs, no one standard format is applicable to all. In general, an author should follow as closely as possible the specifications set for TRs:

- The body of a TD should have a clearly defined beginning, middle, and end.
- A TD should contain headings, particularly when it will be used as a source of continuing reference. Instruction books are an example.
- Visual aids, including tables, are important in most types of TDs. Sometimes, they are more important than the text material and should be included as appropriate.

In summary, the format of a particular TD should be developed so that it best serves the needs of the intended readers.

Authors are encouraged to examine previously published reports and documents in the Technical Library. Publications Branch editors will gladly help an author select one to use as a model.

Front Cover. The outside of the front cover contains the classification designation (secret, confidential, etc.) if the document is classified, the TR or TD number, the date of publication, the title, the name and department of the author(s), the Navy emblem, Division name and location, the distribution statement, and the classification authority and declassification information if the document is classified. Figure 3-3 shows a sample cover for a classified publication; figure 3-4 shows a sample cover for an unclassified one.

Back of Front Cover. The reverse side of the front cover (or preface page) contains the following material (see figure 3-5):

- Preface (administrative information)
  - -NUWC project number and title
  - -Name and code of the principal investigator
  - -Navy project and element numbers
  - -Sponsoring activity
  - -Name of program manager
  - -Name and code of technical reviewer
  - -Acknowledgments, when appropriate
- Date of final review and approval
- Signature of approving authority.

(If acknowledgments are unusually lengthy, they may be shown separately as the last item of the front matter -- i.e., after the foreword, if any.)

SECRET

NUWC-NPT Technical Report 10,230
1 August 1993

Copy _____

Full Spectrum Processing (FSP) Performance Assessment Study: Threat Support Data (U)

Justin S. McLaughlin
Richard E. Volkert, LCDR, USN
Undersea Warfare Analysis Department

Naval Undersea Warfare Center Division
Newport, Rhode Island

Further dissemination only as directed by the Naval Undersea Warfare Center Division, Newport, RI, 1 August 1993, or higher DoD authority.

NOT RELEASABLE TO FOREIGN NATIONALS

Classified by: Multiple Sources
Declassify on: OADR

WARNING NOTICE: INTELLIGENCE SOURCES OR METHODS INVOLVED.

SECRET

*Figure 3-3. Sample Front Cover for a Classified TR or TD**

*Specifications for a classified front cover (bold sans serif typeface): security classification, 24 point; TR/TD number and date, 10 point; title, 18 to 24 point; author's name, 12 point; department designation, 10 point; NUWC Division designation, 24 point; city/state, 20 point; downgrading, distribution statement, warning statement, 9 or 10 point.

NUWC-NPT Technical Document 10,571
14 February 1994

Bibliography of 1993 Publications Issued by the Naval Undersea Warfare Center Division Newport

A. C. Mastan *(Compiler)*
Command Support Department

Naval Undersea Warfare Center Division
Newport, Rhode Island

Distribution authorized to the Department of Defense and U.S. DoD contractors only; Administrative or Operational Use; 14 February 1994. Other requests for this document shall be referred to the Naval Undersea Warfare Center Division, Newport, RI.

*Figure 3-4. Sample Front Cover for an Unclassified TR or TD**

*Specifications for an unclassified front cover (bold sans serif typeface): TR/TD number and date, 10 point; title, 18 to 24 point; author's name, 12 point; department designation, 10 point; NUWC Division designation, 24 point; city/state, 20 point; distribution statement, 10 point.

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PREFACE (U)

(U) This document was funded under NUWC Division Newport Project No. C57000, "ECS Comparison Study," principal investigator H. M. Fiedler (Code 2212). The sponsoring activity is the Space and Naval Warfare Systems Command, program manager CDR D. Smith (PMW-151-4).

(U) The technical reviewer for this report was L. M. Cabral (Code 2212).

(U) The author gratefully acknowledges the enthusiastic support and assistance of the commanders of Submarine Group 12, their staffs, and the officers and radiomen who actually participated in the study.

Reviewed and Approved: 1 February 1993

P. A. La Brecque
Head, Combat Control Systems Department

CONFIDENTIAL

Figure 3-5. Sample Preface for a Classified TR or TD

Documentation Page. In every TR or TD, a completed form SF 298 (figure 3-6) is the first right-hand text page (unnumbered). This is the only place in the TR/TD where the abstract will appear.

Abstract. The abstract is the TR or TD in miniature (limited to 200 words or less). It is generally written by the author or editor after the manuscript is finished, when relevant items are apparent.

Executive Summary. Because an abstract is limited to 200 words, a lengthy publication may have a lean abstract. In this case, an executive summary may be used to provide a digest of the publication, to explain the reason for the work, and to outline principal conclusions and recommendations. When used, the executive summary will be located on the first right-hand page (Roman numeral page i) after the SF 298 and will not normally exceed two pages in length; illustrations should be avoided.

Table of Contents. A table of contents listing all the first- and second-level headings is required in every TR and most TDs. Additional headings are listed only if deemed helpful to the reader. The table of contents will start on Roman numeral page i or iii (depending on whether or not an executive summary is used) and will list (1) items of front matter, beginning with the executive summary or, if an executive summary is not used, with the list of illustrations (when the list of illustrations is (or begins) on the same page as the table of contents, it will not be entered in the contents listing); (2) first- and second-order text headings; and (3) all back matter items (i.e., references, bibliography, appendixes) except for the distribution list. The initial page numbers for each listed item will be shown in a column at the right side of the page. In classified publications, the table of contents must show the level of classification for all items listed. (See figures 3-7 and 3-8.)

List of Illustrations and List of Tables. Such lists are useful to the reader if illustrations or tables are a primary means of communicating important information and must be referred to regularly. Illustrations include circuit schematics, block diagrams, curves, line drawings, photographs, etc.; all constitute figures and will be labeled as such. Tables are a columnar arrangement of data.

When five or more illustrations or tables appear in a TR or TD, a list of illustrations or a list of tables (or both) is required. (This does not prevent using such lists when there are fewer illustrations or tables.) The list will provide the Arabic number, full title, and initial page number of all figures and tables. The list of illustrations will precede the list of tables. These lists need not begin on new pages, but may begin on the page where the preceding front matter section ends if space permits. In classified publications, the list of illustrations or tables will show the classification of each caption or title (figure 3-9).

REPORT DOCUMENTATION PAGE

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OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave Blank)	2. REPORT DATE 8 June 1993	3. REPORT TYPE AND DATES COVERED
4. TITLE AND SUBTITLE Expansions of Cumulative Distribution Functions Directly From Characteristic Functions		5. FUNDING PE 601152N
6. AUTHOR(S) Albert H. Nuttall		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Undersea Warfare Center Detachment 39 Smith Street New London, Connecticut 06320-5594		8. PERFORMING ORG. REPORT NUMBER TR 10,371
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Chief of Naval Research 800 North Quincy Street Arlington, Virginia 22217-5000		10. SPONSORING OR MONITORING AGENCY REPORT NUMBER
11. SUPPLEMENTARY NOTES		
12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.		12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

Expansions of probability density functions and their corresponding cumulative distribution functions, directly from given characteristic functions, have been achieved in a series form, with four parameters that are under the control of the user, thereby enabling realization of more rapidly convergent terms. Typical examples of characteristic functions encountered in detection of multiple matched filter outputs are presented, along with an application to a noisy channel with partially-correlated fading. The series presented here enable immediate evaluation of performance of a related normalizer once the expansion coefficients have been determined. An extension to allow for additive Gaussian noise is realized through a set of simple but efficient recursions.

14. SUBJECT TERMS Cumulative Distributions Fading Application Series Expansions Rapid Convergence			15. NUMBER OF PAGES 60 16. PRICE CODE
17. SECURITY CLASS. OF REPORT Unclassified	18. SECURITY CLASS. OF THIS PAGE Unclassified	19. SECURITY CLASS. OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT SAR

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std Z39-18
298-102

Figure 3-6. Sample Report Documentation Page for an Unclassified Publication

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TABLE OF CONTENTS (U)

Note: Line spacing is double for main entries, single for secondary entries.

i

CONFIDENTIAL

Figure 3-7. Sample Table of Contents for a Classified Publication

CONFIDENTIAL

TABLE OF CONTENTS (U)

i

CONFIDENTIAL

Figure 3-8. Sample Table of Contents for a Classified Decimal-Numbered Publication

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LIST OF ILLUSTRATIONS (U)

LIST OF TABLES (U)

LIST OF ABBREVIATIONS AND ACRONYMS (U)

ADM	Advanced development model
AOB	Angle on the bow
ASH	Antiself-homing
ASW	Antisubmarine warfare
AUTEC	Atlantic Undersea Test and Evaluation Center
AWS	Acoustic warfare system

UNCLASSIFIED

CONFIDENTIAL

Figure 3-9. Sample List of Illustrations, List of Tables, and List of Abbreviations and Acronyms for a Classified Publication

List of Abbreviations and Acronyms. This list (figure 3-9) will be included only when abbreviations or acronyms* are unfamiliar or used frequently in the document. In some publications, symbols or special nomenclature are included in this list. For these cases, the title of the list may be changed to suit its content. For example, it may be titled List of Abbreviations, Acronyms, and Symbols, or List of Abbreviations, Acronyms, and Special Nomenclature, or simply List of Symbols.

Foreword. When a foreword is used, it will be the last front-matter item and it will begin on a right-hand page. A foreword states the purpose of the publication and how it might best be used.

Introduction. The purpose of the introduction is to set the investigation into proper context so that the evidence presented to the reader will be meaningful and easy to follow. The introduction will begin on a right-hand page (page 1), approximately 3 line spaces (0.5 inch or 1.27 cm) beneath the title of the publication, which always appears at the top of the first page. Succeeding sections within the body will begin on the page (right- or left-hand) where the preceding section ends. If there is less than one-third of a page of space remaining (approximately 16 line spaces), a new page will be started. Also, a section may be started on a new page if intervening illustrations or tables make it impractical to start it on the page where the preceding section ends. (If the body is divided into chapters or numbered sections, each chapter or section will begin on a right-hand page.)

Presentation of Evidence. The author presents evidence to the readers so that they can evaluate the investigation in terms of the available facts. Material is out of order if it does not bear directly on the premise announced in the introduction, or briefing. The arrangement of subject matter in the publication depends on the type of investigation and the nature of the subject matter. The usual progression of information, however, is to describe what was done and then present the results achieved.

Conclusions (or Summary). This section is generally subjective. It represents findings or the author's opinion of what was achieved during the investigation, based on the objective(s) set forth in the statement of the problem.

Recommendations. Recommendations are not always required. In many cases, however, the recommendations section brings the reader full circle by presenting a solution to problems posed in the introduction or by showing a need for more research

*Once called out, abbreviations and acronyms should be used consistently throughout the text.

before a solution can be reached. Recommendations are also important because they can provide a sponsor with an assessment of the future requirements of a project

References and Bibliography. References cited in the text will be collected (in the order cited) in a list that will follow the last page of the main text. Unless readability is impaired, superscript Arabic numerals will be used for the citation of references. (Superscripts follow all punctuation marks except for a dash and a closing parenthesis when applying only to the matter within the parentheses.) Reference footnotes (asterisk first, then dagger) will be used in the text only if there are one or two references in the entire publication.

If more than two reference citations are in an appendix(es), the reference list will be moved to follow the last appendix, and a continuation of the main text Arabic numerals for references will be used in the appendix(es). In such a case, the page(s) carrying the reference list will be numbered R-1, R-2, etc. If there are only one or two reference citations in an appendix, they will be footnoted by means of an asterisk first, then a dagger. In this case, the reference list will remain in its normal position, i.e., following the last page of the main text.

The difference between a list of text references and a bibliography is that a standard bibliography lists all sources of information, whereas a reference list accounts only for entries specifically cited in the text. A Ph.D. dissertation, for example, might contain hundreds of bibliographical entries, many of which would not be referred to directly in the text.

If a bibliography is used in place of a list of references, it will follow the last page of the main text. When used together, the bibliography will follow the list of references. Entries in the bibliography will be compiled in alphabetical order by the last name of each author.

At times, a bibliography is used in place of a reference list, and sources are cited in the text by author and year -- e.g., Smith (1986) or (Smith, 1986). In a NUWC Division Newport publication that uses this latter citation scheme, the bibliography is to be altered so that the year of publication for each document is shown in parentheses immediately after the name(s) of the author(s); e.g.,

Smith, J. A., and W. W. Booth (1986a), "How To Be Your Own Editor," *Journal of Technical Writing*, vol. 10.

Smith, J. A., and W. W. Booth (1986b), *Technical Writing Techniques*, Prentice-Hall, Englewood Cliffs, NJ.

Note that in such a bibliography, only the year date will be used (no day or month) for all entries. Note also that when two or more works by the same author(s) have the same year of publication, it is necessary to differentiate them for text reference by adding a, b, c, etc., to the year of publication.

In a publication intended for public release, the reference list and bibliography should not include any classified or limited distribution publications. When such a reference is listed, the publication cannot be released to the general public.

Formats for the list of references and bibliography are shown in figures 3-10 and 3-11, respectively. (Note that the entries in a bibliography are alphabetized by the last name.)

Appendix(es). The following material is typical of that commonly found in appendixes:

- Tabulations of data represented in graphs in the main text,
- Derivations of equations,
- Sample calculations,
- Sample forms used in the investigation, and
- Descriptions of equipment or facilities not important enough to occupy space in the body.

When there are two or more appendixes in a publication, they will be letter designated (A, B, C, etc.). When there is only one appendix, it will not be letter designated, but its pages, illustrations, and table numbers will be shown as A-1, A-2, A-3, etc.

The arrangement of appendixes at the back of the publication will correspond to their order of mention in the text. Each appendix will begin on a right-hand page. The appendix designation and title will be centered, all capitals (first-order-head style), and the appendix text will begin three line spaces below the title on the same page. Appendix title pages will be used only for unusual situations.

Pages, figures, tables, and equations within each appendix will be separately numbered in consecutive Arabic numerals preceded by the appendix letter designation and a hyphen (e.g., figure A-1, table B-2, equation (C-3)).

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1. A. H. Nuttall, "Closed Form Characteristic Function for General Complex Second-Order Form in Correlated Complex Gaussian Random Variables," NUWC-NPT Technical Document 10,403, Naval Undersea Warfare Center Detachment, New London, CT, 12 July 1993 (UNCLASSIFIED).

Classified Report/Document

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5. G. C. Bishop and J. Smith, "A Scattering Model for Nondifferential Periodic Surface Roughness," *Journal of the Acoustical Society of America,* vol. 91, no. 2, 1992, p.143.

Foreign Journal Article

6. L. Magaard, "Zur Berechnung von luftdruck-und windbedingten Bewegungen eines stetig geschichteten, seitlich unbegrenzten Meeres," *Deut. Hydrogr. Z.*, vol. 24, 1971.

Publication with no Author

7. "Introduction to Sonar Technology," Tracor Publication 230, Tracor, Austin, TX, 1965 (UNCLASSIFIED).

*Note that the type or category of a reference is shown here only for tutorial purposes.

21

CONFIDENTIAL

Figure 3-10. Sample List of References for a Classified Publication

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Ph.D. Dissertation

8. B. A. Cray, "Near-Field and Far-Field Sound Radiation From a Line-Driven Fluid-Loaded Infinite Flat Plate Having Periodic and Non-Periodic Attached Rib Stiffeners," Ph.D. Dissertation, North Carolina State University, 1992.

Proceedings or Conference Paper

9. T. C. Choinski, "Economical Development of Complex Computer Systems," *Proceedings of the Complex Systems Engineering Synthesis and Assessment Technology Workshop*, July 1992.

Patent

10. M. A. Smith, "Face Plate Adapter for a Machine Tool," U. S. Patent 5,193,826, patented 16 March 1993.

Message

11. CNO message 051554Z, September 1989 (CONFIDENTIAL).

Letter

12. NUWC ltr to CNO, Ser NUWC/001, 2 January 1992 (UNCLASSIFIED).

Edited, Compiled, or Translated Collection of Works

13. T. S. Albertson, "Technical Writing for DoD," in *A Collection of Technical Writing Guides*, J. A. Smith and W. W. Booth, eds., MIT, Press, Cambridge, MA, 1986.

Private Communication

14. Private communication with D. Ingalls, Applied Physics Laboratory, University of Washington, Seattle, WA, 5 November 1991.

Report in Preparation

15. T. A. Brown, "RANGEX Test Results" (U), NUWC-NPT Technical Document (in preparation), Naval Undersea Warfare Center Division, Newport, RI (CONFIDENTIAL).

22

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Figure 3-10. Sample List of References for a Classified Publication (Cont'd)

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BIBLIOGRAPHY (U)

Bishop, G. C., and J. Smith, "A Scattering Model for Nondifferential Periodic Surface Roughness," *Journal of the Acoustical Society of America*, vol. 91, no. 2, 1992, p.143.

Choinski, T. C., "Economical Development of Complex Computer Systems," *Proceedings of the Complex Systems Engineering Synthesis and Assessment Technology Workshop*, July 1992.

"Introduction to Sonar Technology," Tracor Publication 230, Tracor, Austin, TX, 1965 (UNCLASSIFIED).

Lee, D., A. Cakmak, and R. Vichnevetsky, eds., *Computational Acoustics: Seismo-Ocean Acoustics and Modeling*, North-Holland, New York, 1990.

Love, G. G., and A. P. Kuciaukas, "The Navy Atmospheric Boundary Layer Forecast Model Over San Nicholas Island: An Evaluation," NRL Technical Report 92-7201, Naval Research Laboratory, Monterey, CA, December 1992 (UNCLASSIFIED).

Magnard, L., "Zur Berechnung von luftdruck-und windbedingten Bewegungen eines stetig geschichteten, seitlich unbegrenzten Meeres," *Deut. Hydrogr. Z.*, vol. 24, 1971.

Nuttall, A. H., "Closed Form Characteristic Function for General Complex Second-Order Form in Correlated Complex Gaussian Random Variables," NUWC-NPT Technical Document 10,403, Naval Undersea Warfare Center Detachment, New London, CT, 12 July 1993 (UNCLASSIFIED).

Pinkos, R. F.. and A. F. Bessacini, "Weapon Order Generation (WOG) Computations for the ADCAP Torpedo" (U), NUWC-NPT Technical Report 10,140, Naval Undersea Warfare Center Division, Newport, RI, 14 December 1992 (CONFIDENTIAL).

Smith, M. A., "Face Plate Adapter for a Machine Tool, " U.S. Patent 5,193,826, patented 16 March 1993.

Urick, R. J., *Principles of Underwater Sound for Engineers*, McGraw-Hill, New York, 1967, pp. 82-121.

23

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Figure 3-11. Sample Bibliography for a Classified Publication

Distribution List. The Initial Distribution List for external addressees forms the last page(s) of the publication. If the distribution list is only one page, it will be printed on the inside of the back cover. If the distribution list is more than one page, it will begin on the last right-hand page of the publication, and its pages will be numbered Dist-1, Dist-2, etc. A sample distribution list is shown in figure 3-12.

It is the author's responsibility to ensure that all levels of management up through the department head have reviewed and approved the Initial Distribution List to avoid possible embarrassment, either by the omission of key Navy activities who have an interest in the publication or, conversely, by the unwarranted inclusion of inappropriate addressees.

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INITIAL DISTRIBUTION LIST

Addressee	No. of Copies
Chief of Naval Operations (OP-03EG, OP-95)	2
Naval Surface Warfare Center, White Oak (Code 54)	1
Naval Command, Control, and Ocean Surveillance Center (J. Smith)	1
Program Executive Officer, Undersea Warfare	1
Defense Technical Information Center	2
Analysis & Technology Inc. (J. Jones) (Contract N66604-93-D-0056)*	1

*Note: To satisfy the need-to-know requirements of OPNAV Inst. 5510.1, a current Navy contract number must appear alongside each non-Government agency's name on the distribution list of a classified or limited distribution publication.

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Figure 3-12. Sample Distribution List for a Classified TR or TD

After review by management, the editor will review the distribution list to ensure that copies of the publication are earmarked for the DTIC (12 if for public release and 2 if for limited distribution), CNA, and other addressees who should receive copies (such as the program sponsor). Conversely, the editor must question distribution lists of unusual length to verify the need for such widespread distribution.

The internal distribution list (not printed as part of the final publication) will be formulated during the management review. It is standard procedure to include both NUWC Division Newport and NUWC Detachment New London libraries.

Back Cover. The back cover of a NUWC Division Newport report is blank except for the necessary classification markings. Classification markings are shown flush left in the same manner as on the front cover.

TEXT PREPARATION*

Headings

Headings in text will be prepared as follows (see figure 3-13):

First-Order Heading -- all capitals, bold, centered.

Second-Order Heading -- all capitals, bold, flush left.

Third-Order Heading -- initial capitals, bold italics, flush left.

Fourth-Order Heading -- initial capitals, bold italics, indented approximately 0.5 inch or 1.27 cm from the left margin, followed by a period, run in with the text.

If the report is divided into numbered sections or chapters, first-order headings will be the section or chapter titles.

For further subordination under a given paragraph and for a listing of items, steps, substeps, etc., the format shown in figure 3-14 will be observed. Arabic numerals will be used first, followed by lowercase letters, parenthesized Arabic numerals, and parenthesized lowercase letters. Bullets may be used in place of Arabic numerals when deemed appropriate.

Enumerations that are run in with the text will be indicated by parenthesized Arabic numerals (i.e., (1), (2), (3)).

*A 12-point serif (e.g., Times) font is preferred for all text.

Indentions

Indentions for paragraphs will be as shown in figure 3-13 (i.e., all paragraphs will be indented approximately 0.5 inch or 1.27 cm from the left margin). When security classification markings are used, the security markings will be placed flush left and the text will be indented to the standard paragraph indentation.

For numbered and lettered items and steps, indentions will be as shown in figure 3-14. Primary numbered steps or items will be indented to paragraph depth. Substeps and subitems will be indented so that their letter or number designation begins under the first character of the parent item or step. Runover lines of all steps, items, substeps, and subitems will return to the left margin.

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FIRST-ORDER HEADING (U)

SECOND-ORDER HEADING (U)

Third-Order Heading (U)

(U) Text ----------

----------.

(U) Text ----------
----------.

(U) Fourth-Order Heading. Text ----------
----------.

(U) Text ----------

----------.

Note: A second- or third-order heading that is too long to fit on one line has its second line indented 0.25 inch or 0.6 cm.

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Figure 3-13. Headings in Text for a Classified Publication

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(U) Numbered or lettered items and steps are to be handled as indicated in the following examples

1. (U) First numbered item gets paragraph indention and one line space is left between it and the parent paragraph.

2. (U) If items are lengthy (as these are), use double line spacing; otherwise, single spacing may be used.

3. (U) Be consistent in the use (or nonuse) of closing punctuation; short items and incomplete statements can usually do without punctuation.

4. (U) One space is left after the number or letter of the items in all cases; when classification markings appear in a numbered or lettered item, one space is left before and after the classification marking.

a. (U) Lettered items subordinate to numbered items are indented so that they begin under the first character of the numbered item.

b. (U) Spacing and punctuation for these items follow those used in the parent items.

c. (U) Further subordination examples are indicated below:

(1) First word ...
(2)
(3)
(a)
(b)

5. (U) Runover lines of numbered and lettered items generally return to the left margin.

(U) The advantages of an enumeration run in with the text are (1) there is no confusion with security markings, (2) such a format saves space, and (3) it causes less distraction to the reader.

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Figure 3-14. Numbered and Lettered Items and Steps in a Classified Publication

Spacing Allowances

Line spacing for particular text situations will be as specified in the following tabulation. (Keep in mind that in this context a line space indicates an additional return.)

Between	Spacing
First-order head (chapter or section title) and text or second-order head	2 line spaces
Second-order head and third-order head	1 line space
Second- or third-order head and following text	1 line space
Text of previous section and new first-order head	3 line spaces
Text of previous section and new second-, third-, or fourth-order head	2 line spaces
Text and table title	2 line spaces
Table title and body of table	1 line space
End of table and text	2 line spaces
Text and top of illustration	2 line spaces
Illustration and caption	1 line space
Figure caption and text	2 line spaces
Numbered (and lettered) items under a paragraph	1 line space*
Text and displayed equation	1 line space
First and second lines of displayed equation	1 line space
Last line of displayed equation and text	2 line spaces

Front matter heads (Preface, Table of Contents, List of Illustrations, List of Tables), first-order heads (or chapter and section titles), and back matter heads (References, Bibliography, Appendix, Initial Distribution List) will be 3 line spaces below the top of the 9-inch (22.9-cm) image area unless these sections are considerably less than one page in length; then, the head is further lowered so that the information on the page presents a better appearance.

Page Size and Layout

Text pages will be 8 1/2 by 11 inches (21.5 x 27.9 cm) with an image area of 6 1/2 by 9 inches (16.5 x 22.9 cm) [i.e., a 1-inch

*When items in such a listing are very short, single spacing may be used.

(2.54 cm) margin all around]. Copy usually will be single spaced in a single column with a ragged right margin. If equations or expressions with subscripts or superscripts are run in with the text, then one and one-half spacing is recommended. Marginal copy will include the classification of the page (if the publication is classified) centered top and bottom and the page number placed in the lower outer corner of each page (against the margin, approximately three lines from the bottom of the page, odd numbers at the right margin and even numbers on the left margin). The TD or TR number is no longer required in marginal copy.

Page Numbering

The front cover, its reverse side, and the SF 298 will be unnumbered; remaining pages of the front matter will be numbered in lowercase Roman numerals, with the table of contents beginning on page i or iii (depending on whether or not an executive summary is used). If the front matter ends on a right-hand page, that page will be double numbered; e.g.,

iii/iv
Reverse Blank

The main text, references, and bibliography will be numbered in Arabic numerals, with the introduction starting on page 1. Again, double numbering applies if the last page is a right-hand page.

If deemed useful, pages (as well as illustrations, tables, etc.) may be numbered on a chapter or section basis. In such a case, page numbers will be shown as 1-1, 1-2, 2-1, 2-2, etc.

The appendix pages will be numbered according to the letter designation of the appendix (e.g., A-1, A-2, B-1, B-2). The distribution list page(s) will be unnumbered unless a lengthy list causes a collating problem; in such a case, Dist-1, Dist-2, etc., will be used.

Foldout pages will be double numbered in the same manner as a page with a blank reverse side.

Section and Chapter Numbering

When sections or chapters are used, they will be numbered in consecutive Arabic numerals. The section or chapter titles are the first-order headings in text.

If decimal numbers are used for headings and subheadings in sectionally numbered reports, all figures, tables, equations, appendixes and pages will be decimally numbered.

Footnotes

As shown in this Guide, footnotes to the text are set in 9-point type, double spaced below a 1.5- to 2-inch (3.8- to 5-cm) bar and are set as paragraphs. (The bar itself is triple spaced (two extra returns) below the last line of text.) To avoid conflict with reference citations and exponents, reference marks for footnotes will consist of symbols in the following sequence: asterisk (*), dagger (†), double dagger (‡), section mark (§), parallel (‖), and number sign (#). If more footnotes are required, these symbols are doubled, then tripled. (When there is only one footnote, the asterisk may be used again on a new page.) Footnote marks will follow all punctuation marks except for (1) a dash and (2) a closing parenthesis when the footnote mark applies only to the matter within the parentheses. In a classified publication, the security marking of the footnote will be placed flush left.

Illustrations

Illustrations supplement text, call attention to details, and present ideas difficult to describe by text alone. If an illustration does not fill one of these needs, its use should be questioned. It is the editor's responsibility to see to it that the only artwork used is that which will clearly, adequately, and economically portray the needed information.

Illustrations will be located *after* and *as near as possible to* the first text reference. In special situations (such as a publication containing only a few text pages and many illustrations), all illustrations may be grouped in numerical sequence following the last page of text (preceding the references or bibliography).

Every effort will be made to place illustrations upright (portrait orientation) on the page so that the publication need not be turned sideways to view an illustration. When an illustration must be placed sideways on a page (landscape orientation), it will be turned so that its bottom is adjacent to the right margin of the page. In such cases, the figure caption is also placed on the right margin.

Figure captions (see figure 3-15) will be shown in bold-italic initial capitals for all principal words and will be centered beneath the illustration. In classified publications, the classification of the figure will be shown (all capitals, bold) beneath the figure, and the classification of the figure captions will appear between the figure number and the caption.

Computer-generated plots of similar data -- whether or not intended for direct comparison -- will be prepared on a common scale.

All callouts and dimensional units on illustrations will be in all-capital letters in an 8- to 10-point bold sans serif typeface (e.g., Helvetica). Dimensional units on illustrations may be either spelled out or abbreviated but will be treated consistently within each report. When capitalizing an abbreviated dimensional unit leads to potential confusion (e.g., MW vs mW), the spelled-out form (e.g., MILLIWATTS) or an upper and lower case form may be used.

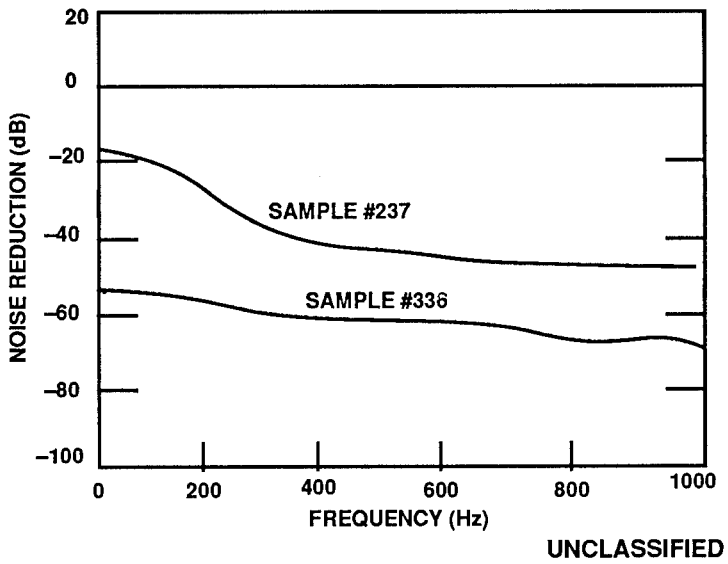

Figure 1. (U) Caption for a Figure in a Classified TR or TD

Figure 2. Caption for a Figure in an Unclassified TR or TD

Figure 3. Caption for a Continued Figure (Cont'd)

Figure 4. Captions With More Than One Line Have Their Runover Lines Centered Beneath First Line

Figure 3-15. Sample Captions and Security Markings for Illustrations

All illustrations (with the exception of small simple sketches sandwiched in the text) will be numbered and captioned. Numbering will be in consecutive Arabic numerals; appendix illustration numbers will be prefixed by the letter designation of the appendix; executive summary illustration numbers will be prefixed by the letters ES (e.g., figure ES-1). If deemed useful, illustrations in a sectionally numbered report may be numbered on a chapter or section basis (e.g., 1-1, 1-2, 1-3).

Foldout illustrations will be avoided whenever possible. When they must be used, foldout pages will have the figure caption, page number (double-numbered), and page classification so located as to be visible when the illustration is folded.

Multicolored illustrations will be avoided except where technical clarity is the reason for requiring color. Multicolor printing cannot be done for decorative purposes only, nor is it a substitute for effective layout and design. (See page 1-5.)

Tables

Tables will be kept as simple as possible and will be set up so that they are easily understood. Horizontal and vertical rules may be used as needed to enhance the readability of the table. Generally, horizontal rules will be used at the head of the table, beneath the column heads, and at the end of the table (the very end of tables that run more than one page). For a sample layout, see table 1-1.

Column headings will be in initial capitals. Applicable units of measurement will be given in the column heading and will not be repeated in the columns.

Tables will be located after and as near as possible to the first text reference (except in special situations). To the maximum extent possible, tables will be placed upright (portrait orientation) on the page. Those that must be placed sideways (landscape orientation) will have the top of the table adjacent to the left margin.

All tables (except for small tabulations sandwiched in the text) will be numbered and titled. Numbering will be in consecutive Arabic numerals; appendix table numbers will be prefixed by the letter designation of the appendix; executive summary tables will be prefixed by the letters ES (e.g., ES-1). If deemed useful, tables in a sectionally numbered report may be numbered on a chapter or section basis (e.g., 1-1, 1-2, 1-3). Titles will be shown in bold-italic initial capitals for all principal words and will be centered above the table. Spacing and punctuation within table titles will be as shown for figure captions in figure 3-15.

Tables continued from page to page will repeat the full title of the table followed by the abbreviation *Cont'd* in parentheses. On continued pages of a table, all column headings will be repeated. For a landscape table continued from a left- to a right-hand page, neither the table title nor the column heads need be repeated.

Footnotes to tables will be set as paragraphs, will begin immediately beneath the table's bottom rule, and will employ the same symbology as footnotes to text (see page 3-30). (Several very short notes may be spaced out on the same line.) If a table runs more than one page, the appropriate footnotes will go with each page or all footnotes will be placed at the end of the table and the note *See footnotes at end of table* will be shown at the bottom of each table page.

In classified documents, the classification of the table will be displayed beneath the table and the classification of the table title will appear between the table number and title, as shown for illustrations in figure 3-15. (Footnotes to tables do not require a separate classification.)

Mathematical Matter

All mathematical matter will be treated as part of a grammatically correct sentence; thus, in all cases, proper punctuation must be used. All numbered equations will be typed on a separate line. All unnumbered but complicated equations should be typed on a separate line and not run in with the text.

Displayed Equations. Displayed equations will be placed immediately after their associated text and all will be indented one paragraph indent from the left margin. The overrun from equations requiring more than one line will begin to the right of the primary equal sign. Such equations will be broken before an equal, plus, minus, or multiplication sign, and these operation signs will be carried over to the following line.

Connecting words of explanation, such as hence, therefore, similarly, etc., will be set flush left on a separate line when they are followed by a displayed equation.

The word "where" following an equation will be set flush left and ensuing terms and definitions, if simple and uncomplicated, will be run in with it (in paragraph form). If terms or definitions involve complicated mathematical expressions or built-up fractions, they will be displayed, each indented one paragraph

indent beginning on the second line space below the "where" line. Double spacing will normally be used between the terms.

Run-in Equations. Short equations run in with the text will not be broken if at all possible. Fractions in such equations will not be built up (solidus will be used). For fractions in displayed equations, the solidus will be used whenever possible. But if one fraction within an equation must be built up, all main-line fractions in that equation will be built up.

When appearing together, subscripts and superscripts should be aligned on the left (e.g., R^{e}_{max}).

Spacing within Equations. Guidelines for spacing within equations are as follows:

1. Leave no space between a character and its superscripts and subscripts, between a character and factorial signs, between a character and primes.

2. Close up all parts of a superscript and subscript pattern and all parts of limits to an integral, summation, product, etc. For example,

$$x^{-eij} = y_{abc} \tag{3-1}$$

and

$$x = \sum_{n=1,2,3}^{a-b} \frac{a_n + b}{b_n} + \int_{b+2}^{a+1} dx\,. \tag{3-2}$$

3. On the main line of an equation, allow one space before and after operation signs (=, +, –, x, etc.), but no spacing after a sign describing a negative or positive quantity. For example,

$$a + b = -c(d + e) + \frac{f + g}{h + i}\,. \tag{3-3}$$

4. Allow one space before and after (the full expanse of) an integral, summation, product, lim, min, max, etc. For example,

$$x = \sum_{n=1,2,3}^{a-b} \frac{a_n + b}{b^2} + \int_{b+2}^{a+1} dx + \sqrt{a^2b^2c^3}$$

$$+ \frac{a_n + b}{b_n} + \int_{f+2}^{e+1} dx + \sum_{n=1,2,3}^{g-h} \frac{g_n}{h_n}, \tag{3-4}$$

$$x = \lim_{a \to \infty} a/2 , \tag{3-5}$$

and

$$\min_{a<b<c} = \max_{a<b<c} R(abc) . \tag{3-6}$$

5. Except as indicated in item 3, leave no space between any character and an opening parenthesis, bracket, or brace, and leave no space between back-to-back parentheses, brackets, or braces:

$$a(b + c) = [d(e + f)g][(h + i)(j + k)]^2. \tag{3-7}$$

6. Leave one space before and after sin, cos, tan, log, etc., except when they immediately precede a parenthesis, bracket, or brace, in which case close them up. Close up superscripts and subscripts to these terms:

$$\sin x = \sin y + d \tan(x + y) + \cos^2 B, \tag{3-8}$$

$$\log x = \log c + \log(a + b) + 2 \log_{10} y. \tag{3-9}$$

7. Except as indicated in the foregoing, leave one space

a. On each side of built-up fractions,

b. On each side of a radical sign,

c. On each side of differential pairs, and

d. Between two fractions on the main line.

8. When appearing together in the same equation, use parentheses first, followed by brackets, and then braces:

$$\left\{\left[\frac{(x+y)(a+b)}{2ax}\right]\left[\frac{(c+d)(y+z)}{2y}\right]\right\}^2 \qquad (3\text{-}10)$$

Equation Numbering. Equations will be numbered in consecutive Arabic numerals enclosed in parentheses, e.g., equation (1). Appendix equation numbers will be prefixed by the letter designation of the appendix, e.g., equation (A-1). In a sectionally numbered report, equations may be numbered on a chapter or section basis. In such a case, equation numbers will be (1.1), (1.2), (1.3), etc., or (1-1), (1-2), (1-3), etc. Equation numbers will be located against the right margin on a line with the main line of the equation. (For equations that run more than one line, the number will be shown on the last line of the equation.) A series of related equations may be numbered individually (e.g., (3a), (3b), (3c)) or may have an all-inclusive number placed on a line with the center equation of the series.

Numbering of displayed mathematical matter serves two purposes: to give prominence to a particular expression and to facilitate later reference to it. Thus, not all equations need be numbered.

CHANGES AND REVISIONS

Changes to TRs and TDs are issued when minor corrections are needed. Either a list of pen-and-ink corrections or revised replacement pages are issued to the original distribution list.

If changes to a TR or TD affect a substantial number of pages (i.e., approximately 50 percent of the document), a revision (rather than a change) is prepared. For TR/TD revisions, the original publication number is changed by adding the letter of the alphabet that indicates which revision it is, a supersedure notice is placed on the front cover, and the revised publication is printed and distributed to replace the original version. If a revision affects the classification or distribution limitations of the original publication, the proper security markings and/or distribution statement must be applied to the revised document.

Every addressee who received of copy of the original TR or TD should receive a copy of the changed or revised manuscript.

4. TECHNICAL MEMORANDUM (TM)

INTRODUCTION

The technical memorandum (TM) is designed to provide an expeditious means for engineers and scientists to document and disseminate technical and scientific information within NUWC Division Newport. The general standards for its preparation and processing are described below. (See NUWCDIVNPTINST 5602.1 for further information.)

CONTENT

The TM usually contains information that covers short-range projects or the day-to-day operations of projects in formative stages. A TM also provides program managers and authors with a medium to express tentative work proposals and a cost-effective format for both quick response R&D documentation and individual professional comment.

PREPARATION AND RELEASE PROCEDURES

Responsibility for preparing a TM lies with the author. The author is also responsible for routing the TM to division or department heads (via supervisors or branch heads) for prior review and approval before submission for processing and/or print and distribution. TMs are processed through the Publications Branch, where basic editing services are available to assist the author in preparing the final copy. The Publications Branch is responsible for assigning TM numbers.

Security Markings

The authors of a TM are responsible for (1) determining the proper security classification of the TM, (2) correctly applying the required security markings in the text and on the cover, and (3) routing the TM through the proper security review cycle in accordance with the NUWC Division Newport Security Manual (NUWCDIVNPTINST 5500.4).* The Security Division is available for assistance in security matters. A basic review of classification markings required for NUWC Division Newport publications is given in section 2 of this Guide.

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*It is recommended that all TMs be routed through the Security Division.

Distribution

Before submitting a TM for review, the author will prepare a distribution list and select one of the distribution statements shown in table 2-1, section 2, for use on the TM cover.

Internal Distribution Only. A TM that is intended solely for distribution within NUWC Division Newport is routed to the division head (or equivalent) for review. Such a TM will carry distribution statement B, C, D, E, F, or X (table 2-1).

External Distribution. Although TMs are designed primarily for internal communication, external distribution of selected TMs is encouraged (see NUWCDIVNPTINST 5602.1). In this case, the author must ensure that the TM is submitted to the department head or director before release. Other regulations concerning policy for the external release of a TM are listed below:

For Public Release: An unclassified TM that is released to the general public (distribution statement A) must undergo the review as described in section 2 (page 2-6).

As Official Policy: As a general rule, a TM is understood to represent NUWC Division Newport policy only when accompanied by an official letter of endorsement. Thus, if a TM is released for distribution to an external addressee, it may not be regarded as an official publication unless it is accompanied by a letter that specifically approves its contents. Otherwise, the TM is released for information only.

To Other Government Agencies: Department heads, directors, and the deputy director may release TMs to other laboratories and centers, fleet commands, program managers, and similar levels. In the case of Flag Ranks, a TM will be released only with the written approval of the Commander or the Executive Director.

To DTIC: Upon the recommendation of the author and the cognizant department head or director, TMs of interest to the R&D technical community shall be forwarded (along with a completed form SF 298) to the Defense Technical Information Center (DTIC). Unclassified TMs released to DTIC must be approved for public release or carry statement B, C, D, E, F, or X.

To Contractors: A TM shall not be released for external distribution to a Navy contractor unless a need-to-know has been established. In the case of NUWC Division Newport contracts or Naval Systems Command contracts for which NUWC Division Newport has been specifically assigned the technical guidance function, decisions on the release of specific publications will be made locally. Such decisions will be made on the basis of

recommendations by the senior project engineer responsible for the contracts in question and will require a review by the Security Division and the approval of the department head or director.

When a TM is to be released to a Navy contractor, the document transmittal must refer to the contract under which the contractor's need for the TM has been established.

Requests by contractors for the loan of classified TMs relating to contracts for which NUWC Division Newport has no responsibility must be sent via the cognizant contracting Systems Command (sponsor) in the form of a letter of endorsement. This letter of endorsement must certify the contractor's need-to-know for the requested material in terms of a specific contract.

When a TM is released on a loan basis, the document transmittal indicates that the publication is being loaned for a specific period (e.g., 30, 60, 90 days) or for the duration of the contract. The transmittal is forwarded via the Security Division, which will affirm the necessary need-to-know, facility clearance, and storage capability of the recipient.

FORMAT

The format of a TM is designed to disseminate information quickly and cost effectively to a limited number of recipients. It is a modified version of the format used with technical reports (TRs) and technical documents (TDs). For formatting guidance not provided below, authors may consult section 3.

Front Matter

The simplified front matter includes

- Front Cover
- Abstract
- Administrative Information.

Front Cover. The TM cover (figure 4-1) includes the TM number, the address of the Division, the TM title, the author's name and affiliation, the publication date, and the applicable distribution statement. In addition, for classified TMs, the cover must include classification markings and a classification authority statement. (The cover is generally prepared in the same font and point size as the body of the TM.)

Abstract and Administrative Information. The abstract and administrative information appear on the first page of the TM, as shown in figure 4-2. The abstract section should be of the informative type and should be kept to under half a page.

CONFIDENTIAL

NUWC-NPT Technical Memorandum 931022

Naval Undersea Warfare Center Division
Newport, Rhode Island

MLTA LOCALIZATION TASK DATA SUMMARY
1992 MLTA SEA TRIAL (U)

John P. Ianniello
Submarine Sonar Department

25 February 1993

Distribution authorized to the Department of Defense and U.S. DoD Contractors only; Critical Technology; 25 February 1993. Other requests for this document shall be referred to the Naval Undersea Warfare Center Division, Newport, RI.

Classified by: Multiple Sources
Declassify on: OADR

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Figure 4-1. Sample Cover for a Classified TM

CONFIDENTIAL

ABSTRACT (U)

(U) This memorandum summarizes the data collected during the Localization Task portion of the 1992 MLTA sea trial and reviews the quality of the data. The objective of the localization portion of the trial was to collect data to be used to develop and test, in the laboratory, localization techniques for a towed array with large vertical aperture. The intent was to obtain data under simple range and depth-independent conditions.

ADMINISTRATIVE INFORMATION (U)

(U) The sea test described in this memorandum was performed under Task 5 of the Multidimensional Towed Array Project as part of the Submarine/Surface Ship USW Surveillance Program sponsored by the Antisubmarine Warfare/Undersea Technology Directorate of the Office of Naval Technology; Project Number RJ14D12; NUWC Division Newport Job Order No. B60003; Principal Investigator, Dr. J. P. Ianniello (Code 2123); Program Director, G. C. Connolly (Code 2192). The sponsoring activity's Technology Area Manager for Undersea Target Surveillance is T. G. Goldsberry (ONT 231).

(U) The author of this memorandum is located at the Naval Undersea Warfare Center Detachment, New London, CT 06320.

ACKNOWLEDGMENTS (U)

(U) The author acknowledges the contributions of a number of people to the data collection described in this memorandum. Included are R. Vanasse, P. Gianquinto, H. Ware, M. Seil, R. Greene, S. Dowling, G. Assard, J. Nuttall, A. Lesick, S. Smith, R. Choma, J. Law, and M. Tattersall. The author would also like to thank R. Kneipfer, N. Owsley, E. Podeszwa, R. Garvine (University of Delaware), and M. Murphy (Shearwater) for their review and comments.

i/ii
Reverse Blank

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Figure 4-2. Sample Abstract and Administrative Information for a Classified TM

The administrative information section should designate such items as the project number and its title, the principal investigator, the Navy subproject and task number, the Washington-level program manager, the funding organization and its code, and the contract number (if any).

If an acknowledgment is appropriate, it may appear as the last item on the same page as the abstract and administrative information.

Body

Introduction. All TMs must have an introduction. It should be short and to the point, providing readers with the following information:

- Background material necessary to understand the message
- Purpose of the TM
- Scope of the TM
- Relationship of the work to concerned NUWC Division Newport projects.

The introduction is titled INTRODUCTION.

Presentation. Authors may choose whatever order they believe will be the most effective for the presentation of the subject matter. However, the organization of the information should follow some logical plan. Authors may use headings and subheadings to emphasize material or divide it into sections. The wording should be chosen so that the final writing is straight-forward and easy to read. Tables and figures should be included whenever necessary to supplement the text.

End Matter

The use of supporting material, such as a list of references or an appendix, is left to the judgment of the author. A distribution list must be included; the format of this list is shown in figure 4-3.

TEXT PREPARATION

The final copy of a TM is typed in the author's own organizational section. To conserve paper, TMs of more than a few pages will be duplicated back-to-back. (The local Defense Printing Service office will assist in this matter.) For classified TMs, each page shall bear the overall classification of the TM, and

the security classification of each paragraph shall be indicated at the beginning of the paragraph as (U), (C), (S), (C-NF), (S-NF), (CAN-C), etc. (see section 2).

To help keep TMs short, main sections (except for the introduction) do not have to begin on new pages (even if main sections are numbered). Main headings are typed in all capital letters, and triple spacing is used between the end of one section and the heading for the next section, so that the division of the material is self-evident.

To expedite the typing and assembly, figures generally are grouped at the end of the TM. Small figures, such as simple curves and logic diagrams, may be inserted into the text if the author believes they will help the reader understand the material more readily. It is not recommended, however, that illustrations appear both in the text and at the end of the TM.

For additional guidance in text preparation (fonts, page size, margin, and spacing allowances, illustrations, tables, mathematical matter), authors may refer to section 3 (including figures 3-13, 3-14, and 3-15).

CHANGES AND REVISIONS

Changes to TMs are issued when minor corrections are needed. Either a list of pen-and-ink corrections or revised replacement pages are issued in accordance with the original distribution list.

If changes to a TM affect a substantial number of pages (i.e., approximately 50 percent of the document), a revision (rather than a change) is prepared. For TM revisions, the original TM number is followed by the letter of the alphabet that indicates which revision it is, a supersedure notice is placed on the front cover, and the revised TM is printed and distributed to replace the original version. If a revision affects the classification or distribution of the TM, the proper security markings and/or distribution statement must be applied.

Every addressee who received a copy of the original TM must receive a copy of the changed or revised manuscript.

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NUWC-NPT TM 931022

DISTRIBUTION LIST

External
Naval Sea Systems Command (SEA-05V, -51)
Chief of Naval Operations (N86T)
APL/Johns Hopkins University (Attn: M. Blackberg)
(Contract N00039-91-C-0001)

Internal
Codes: 10
101
21
211
212
213
2123 (J. Ianniello (6), J. Law, D. Leary)
0261 (NLON Library)
0262 (NPT Library)

Total: 20

[Note: The distribution list is prepared by the author; it should include the desired external and internal addressees, in addition to the standard internal addressees (author, libraries, etc.).]

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Figure 4-3. Sample Distribution List for a Classified TM

5. TECHNICAL MANUAL

INTRODUCTION

A technical manual is the basic source of technical information for fleet personnel responsible for the installation, operation, maintenance, repair, and parts support of military systems and equipment. All systems for which NUWC Division Newport is the In-Service Engineering Agent (ISEA) must be supported by a technical manuals program. The Technical Manuals and Data Management Group of the Publications Branch (hereafter referred to as Technical Manuals Group) is the focal point for coordination of NUWC Division Newport's technical manual programs.

Guidance in the preparation of technical manuals for the fleet is provided through Naval Sea Systems Command (NAVSEA) directives that define the policies, procedures, and responsibilities for the acquisition of new technical manuals and the maintenance of existing ones. Among these directives are NAVSEAINST 4160.3, which describes the Technical Manual Management program (TMMP), and NAVSEA S0005-AA-PRO-010, which defines TMMP operations and procedures. NAVSEAINST 4160.3 is used in combination with S0005-AA-PRO-010 to enable NAVSEA activities to procure and manage technical manuals in a responsible and effective manner.

Guidance for the format and content of technical manuals is given in individual Technical Manual Contract Requirements (TMCRs) or Technical Manual Seatask Requirements (TMSRs). TMCRs and TMSRs are used to specify technical manual requirements in all procurement requests, solicitations, contracts, and tasking documents, including those applying to hardware modifications. A new TMCR/TMSR must be obtained from the Naval Sea Data Support Activity (NSDSA), Port Hueneme, CA, for each new manual. Revisions and changes are developed under blanket TMCRs.

A TMCR is required for all NAVSEA technical manuals including revisions and changes prepared by contractors. A TMSR is required for all NAVSEA technical manuals developed in-house at NUWC Division Newport, including basic manuals, changes, and revisions. It is the responsibility of the product lines involved

in the procurement of technical manuals to obtain TMCR/TMSRs. The Technical Manuals Group will coordinate TMCR/TMSR request submittals for NUWC Division Newport or NUWC Detachment New London codes with the appropriate codes at NSDSA. When requested, Technical Manuals Group personnel will prepare the TMCR/TMSRs for the procuring code by completing and submitting a completed Technical Manual Acquisition Requirement Checklist (TMARC), NAVSEA 9086/12, to NSDSA for approval.

The TMARC specifies the process by which an acquisition activity tailors requirements listed on the form using the Modular Specification System (M-SPECS) to obtain a technical manual that meets the activity's operational requirements. Ensuring the preparation and submittal of the TMARC and compliance with NAVSEA policies and regulations is the responsibility of the procuring code. Copies of the TMARC forms can be obtained from the Technical Manuals Group or NSDSA.

A Technical Manuals Identification Number-Request (TMIN-R) form is submitted to obtain a technical manual number and a stock number assignment (if the document is being stocked by the Navy supply system). A TMIN-R is submitted for each new manual, change, or revision. Advance Change Notices (ACNs) are assigned control numbers and do not require a TMIN-R form. The control numbers are formally requested by NUWC Division Newport (Technical Manuals Group) from NSDSA.

TECHNICAL MANUAL DEFICIENCY REPORTING

Deficiencies adversely affect accuracy, adequacy, usability, and safety; thus, the NAVSEA Technical Manual Deficiency/ Evaluation Report (TMDER) reporting system has the following as its goals:

1. Rapid and accurate reporting of identified deficiencies,
2. Rapid solution of reported deficiencies by technical manual updating, and
3. Capturing data related to the deficiency.

The TMDER (NAVSEA 9086/10) is the primary medium for reporting a technical manual deficiency.

NUWC Division Newport (Technical Manuals Group) is the point-of-contact for receipt of TMDERS from NSDSA. Upon receipt of a TMDER, it will be forwarded to the appropriate

product line for engineering review, appraisal, and resolution. The Technical Manuals Group is also the point-of-contact for NSDSA regarding the tracking of responses to the TMDERS sent to NUWC Division Newport codes. Unanswered TMDERs are tracked and reported to NUWC Division Newport by a monthly report. The Technical Manuals Group will take appropriate actions to resolve any unanswered TMDERs, and, when directed, can directly respond to a TMDER for the appropriate product line code.

PREPARATION RESPONSIBILITIES

The preparation of a technical manual requires coordinated effort between the cognizant NUWC Division Newport organizational unit and the Technical Manuals Group.

Organizational Unit Responsibilities

The cognizant organizational unit has overall responsibility for the preparation and maintenance of publications under its program management, including responsibility for technical validity, accuracy, and adequacy. The organizational unit performs the following functions:

1. Establishes the technical requirements and priority for preparation or revision of a publication.

2. Provides the Technical Manuals Group with the technical intent or changes required.

3. Verifies the accuracy and adequacy of each new publication or proposed change by performing or witnessing the performance of the procedure with the actual hardware and test equipment or desktop review, as the situation warrants.

4. Provides engineering or technical assistance.

5. Reviews and approves completed publications for compliance with technical intent before release for printing and distribution.

Technical Manuals Group Responsibilities

The Technical Manuals Group is currently responsible for administering most technical manuals for NUWC Division Newport and for coordinating the efforts involved in the preparation of new technical manuals and the maintenance and update of existing technical manuals (revisions, changes, etc.) and other documentation (ordnance alterations (ORDALTs), field change bulletins (FCBs), etc.) as needed by program requirements.

The Technical Manuals Group maintains close liaison with NAVSEA, other project sponsors, and NSDSA to ensure that technical manual policies are current and properly implemented. The Technical Manuals Group coordinator is contacted during the early stages of procurements involving technical manuals to ensure that these efforts are properly planned, scheduled, and managed. The Technical Manuals Group functions include the following:

Coordination. Plan, schedule, and accomplish -- both in-house and by contract -- preparation and production of all new and revised publications, and changes to publications assigned to NUWC Division Newport. Participate in the establishment of funding requirements and budgetary estimates for the preparation and publication of new, revised, or changed technical manuals.

Contract Monitoring. Obtain a TMCR/TMSR from NSDSA for all manuals required to support the hardware, and request any required modifications/deviations from technical content and format. Submit TMIN-R requests or requests for control numbers, as required. Review and approve the manual outline, the review manuscript, and the final reproducible copy. Conduct in-process reviews for conformance with specifications, editorial requirements, writing level, and overall effectiveness. Cooperate with the project engineer in checking the technical content of the manual.

Maintenance. Maintain a storage facility in Bldg. 22 for camera-ready copy, electronic media, board art, negatives, and work files for NUWC Division controlled technical manuals.

Verification and Validation. Assist technical personnel and project engineers in on-site verification procedures. Ensure that the manual meets all requirements for format, content, presentation, accuracy, and adequacy. Assist in contractor/preparer validations and fleet verifications when required.

Technical Manual Certification Sheet (NAVSEA Form 4160/8). The certification sheet is signed by the appropriate engineering reviewer(s), editor, and printing control personnel. Reviewers are determined by the appropriate product lines and are responsible for certifying that the manual has been validated, verified, and conforms to all technical and specification requirements. The certification sheet is included in all new technical manuals, changes, and revisions in accordance with NSDSA requirements.

Computer-Aided Logistic Support (CALS). To achieve productivity and quality improvements, the DoD-directed CALS initiative sets the goal of acquiring technical data in digitized form. All technical manuals obtained under new procurements must now comply with standardization requirements for computerized production, storage, retrieval, and transmission of digitized data as set forth in the CALS standards and specifications, using such tools as Standardized General Markup Language (SGML). Older programs may also be converted to CALS format, as budgetary and operational requirements allow. Print-on-demand may also be required in some programs.

The Technical Manuals Group assists preparers with the implementations of CALS standards and in such areas as the application of SGML tagging, digitized preparation, and electronic presentation formatting for Interactive Electronic Technical Manuals (IETM) and Electronic Technical Manuals (ETM). Style and format requirements are reviewed to maintain general Navy policies in these areas.

Format and Text Preparation. The format of all technical manuals must be prepared in accordance with an approved military specification, such as MIL-M-38784, unless otherwise defined in an approved content specification or the TMCR/TMSR. Specification MIL-M-38784 also describes the general requirements for text preparation. Approved specifications are listed in NAVSEAINST 4160.3 and in S0005-AA-PRO-010.

The Technical Manuals Group ensures compliance with all appropriate standards and specifications.

OTHER MANUAL-RELATED DOCUMENTATION

In addition to preparing and revising technical manuals, the Technical Manuals Group prepares other related documentation, mainly ORDALTs. Technical manuals editors may also be involved in the preparation and maintenance of other types of documentation needed for fleet support. These include the following:

Ordnance Alterations (ORDALTs)

An ORDALT instruction is a technical directive that contains the detailed instructions, provisioning information, support documentation, test procedures, and other related information required to perform an alteration to naval ordnance

equipment. An ORDALT is a change made to ordnance equipment by the addition, deletion, rework, or replacement of parts, assemblies, or equipment, by a change in material, or by a change in assembly procedures. In most instances, the release of ORDALT instructions must be coordinated with technical manual changes reflecting incorporation of the ORDALT. The format for ORDALTs is specified in MIL-STD-1662.

Field Change Bulletins (FCBs)

FCBs provide a list of materials supplied or required and step-by-step instructions to accomplish a field change. A field change is any modification or alteration made to electronic equipment for the purpose of improving the performance, operation, maintainability, reliability, and safety of that equipment. FCBs are usually accomplished after delivery of the equipment to the Government.

Engineering Change Proposals (ECPs) and Engineering Changes (ECs)

ECPs and ECs involve an alteration in the configuration of an item delivered or under development. Such ECPs or changes frequently apply to drawings, which can become part of a kit to accomplish a field change. The ECP generally contains a Notice of Revision (NOR) section that describes the impact the engineering changes in the ECP will have on particular technical manuals. These NORs are frequently used as the source data vehicles that require upgrades to the technical manual to reflect the engineering change.

Test Procedures

When required, test procedures are written to document shipboard equipment certification and testing. Certification teams use maintenance cards or test procedures to ensure that shipboard equipment meets design specifications.

Maintenance Index Pages (MIPs) and Maintenance Requirement Cards (MRCs)

MIPs and MRCs are used by fleet personnel to perform periodic maintenance on equipment. Coordination is required to reduce redundancy in information and to ensure consistency and compatibility between both sets of documents.

6. OTHER PUBLICATIONS

TECHNICAL ARTICLE

Purpose

Engineers and scientists are encouraged to publish technical articles relating to their work. In fact, monetary incentive awards of up to $250 are made for journal articles, in accordance with NUWCDIVNPTINST 12451.2. It is believed that publication in professional journals not only advances the stature of authors among their colleagues but also reflects favorably on NUWC.

Not all types of investigations lend themselves to journalistic reporting, but certainly much of Division Newport's work is of interest to the technical and scientific communities at-large. Prospective authors who believe they have acceptable material should compare it with the type and scope of material that appears in the journals.

Publishing material from a single manuscript in different formats (as a TR and as a journal article, for example) is to be avoided whenever possible. NUWC Division Newport's policy on dual publication is discussed in section 1.

Valuable help in publishing technical articles may be obtained from Publications Branch personnel, or from the Technical Library staff. The library subscribes to all journals and magazines of note in technical fields allied with the work done at NUWC Division Newport. The library's reference personnel can check on articles dealing with the subject matter to provide an adequate picture of the research and publication in a given field.

Preparation Procedures

Articles for professional journals are prepared by the author in accordance with the specifications of the journal. Editing assistance is available from the Publications Branch. Articles are submitted to the journal with a forwarding letter prepared by the author and signed by the author's department head.

All articles prepared for publication in the public domain must receive clearance for public release, in accordance with NUWCNPTINST 5570.1 (see section 2). (Distribution statement A must appear in the lower right-hand corner of the title page.) Classified articles are to be submitted to controlled publications only, such as the *U.S. Navy Journal of Underwater Acoustics*.

The length and format of each article vary according to the specifications set by the publishing agency. The Technical Library Division has on file authors' guides published by various professional societies and government agencies. Many journals print their *Information for Contributors*, i.e., specifications and requirements, in their first issue for the calendar year. Publications Branch writers and editors can also provide assistance.

TECHNICAL BROCHURE AND PAMPHLET

Purpose

A brochure or pamphlet is a management-approved publication designed to meet a special communication need or purpose. It is usually prepared for wide distribution, often for a segment of the general public.

Brochures and pamphlets are used to announce the availability of special services and facilities or to address an outside audience about subjects of special or general interest. Examples include descriptive pamphlets on facilities and recruitment brochures. Brochures and pamphlets are generally custom-designed publications and considered technical documents and carry NUWC Division Newport TD numbers. In specific instances, however, if the material is nontechnical, the brochure or pamphlet will be considered an administrative publication (see page 6-5).

Preparation Procedures

A badly conceived or poorly executed brochure communicates a correspondingly negative image of NUWC Division Newport. For this reason, among others, the originator of a brochure or pamphlet must obtain approval from the department head and assistance from the Publications Branch and Visual Information Branch (e.g., to edit the text, design the layout, route the publication for review, and arrange for printing and distribution).

The originator of a brochure or pamphlet must provide the Publications Branch with a proposed distribution list (external and internal). This list will be submitted for approval along with the brochure to the approving official (usually the cognizant department head). For recruiting brochures and other brochures having Division-wide application, the signing and approving official is the Division Commander. (The review cycle for recruiting brochures or pamphlets will also include the Personnel Department.)

Arrangements for printing and distribution will be made by the Publications Branch. The number of copies to be printed is based on present and future needs of the originator and other organizational units. The requesting cost center is expected to bear the cost of preparation and printing. The Publications Branch ensures that external distribution is in accordance with the list provided, as well as internal distribution to the department or division level, as appropriate. Storage and later distribution of extra copies are the responsibilities of the originator.

REPRINT REPORT

Purpose

The reprint report is an efficient and economical means of further disseminating material that has been published previously either in a professional journal or in the proceedings of a conference or symposium. Formal viewgraph presentations may also be documented in a reprint report.

Preparation Procedures

For journal articles, reprints from the journal are obtained and published under a NUWC Division Newport cover. For conference or symposium papers or presentations, a reproducible copy of the paper or presentation is reserved at initial preparation for later use in publishing the reprint report.

Reprint reports require no management review and no approval signature as the material they reproduce would have been approved previously for publication in the journal or in the conference proceedings. Further, reprint reports include no front matter (i.e., the preface, report documentation page, table of contents, list of illustrations, etc.) and no distribution list. The cover of a reprint report (see figure 6-1) indicates the original place of publication (i.e., journal name, volume no., and date; or the conference name, date, and location).

Reprint reports are processed as follows:

1. The Publications Branch verifies that public release approval has been obtained, prepares the report cover, and secures the intended distribution list from the author.

2. The author reviews the final package and approves publication.

3. The cover and reprints (or reproducible pages) are sent for reproduction and binding.

NUWC-NPT Reprint Report 10,232
15 July 1993

Rotating Two-Phase Flow Through a Confined Cylinder

Promode R. Bandyopadhyay
James D. Hrubes
Gregory C. Pacifico
William G. Fennell
Weapons Technology and Undersea Systems Department

Naval Undersea Warfare Center Division
Newport, Rhode Island

Approved for public release; distribution is unlimited.

Reprint of a paper presented at the *ASME Fluids Engineering Conference*, 20-23 June 1993, Washington, DC, and published in *Forum on Unsteady Flows 1993*, FED-Vol. 157, ASME Fluids Engineering Division.

*Figure 6-1. Sample Cover for a Reprint Report**

*Specifications for a reprint report cover (bold sans serif typeface): report number and date, 10 point; title, 18 to 24 point; author's name, 12 point; department designation, 10 point; NUWC Division designation, 24 point; city/state, 20 point; distribution statement and conference information, 10 point.

4. Distribution is made. (No reprint reports are sent to DTIC. Internal distribution will include copies for the Newport and New London libraries.)

ADMINISTRATIVE PUBLICATION (AP)

Purpose

APs cover a broad range of nontechnical information. Depending on purpose, the AP may be issued in standard TR or TD format or as a custom-designed publication. APs may contain formal reporting on significant matters relating to NUWC Division Newport's management or administration.

Preparation Procedure

Preparation, review, and release procedures are the same as for other formal reports. APs require editing, management review, and signature by the cognizant Department Head or Director. In addition, SECNAVINST 5600.16 requires that APs be reviewed to determine if they are necessary, applicable, and meet established policy.

7. PRESENTATIONS

INTRODUCTION

The Visual Information Branch establishes, implements, and applies specific standards for all graphics prepared in-house or on a contract basis for NUWC Division Newport. These standards are established to meet the requirements of the media used to convey the information. The media may be (1) illustrations for formal reports, documents, or professional journals, or (2) presentation graphics (i.e., viewgraphs or slides) that incorporate words, illustrations, photographs, etc. Whatever the media, these standards and specifications have been established to ensure consistency and to reflect professionalism.

GETTING STARTED

The successful delivery of an effective presentation begins with careful thought and thorough organization during the creation process. The first step in preparinging a presentation is to determine its purpose. Why is this presentation being delivered? What is the objective? The following steps are recommended for the originator of a presentation

Determine the Audience

First, analyze the audience. How many attendees are expected, what are their backgrounds, how much do they know about the subject, and what information is the audience looking for? The information should be appropriately tailored to the audience: e.g., scientists, engineers, technicians, managers, executives, sponsors, Congressional representatives.

Organization

Next, prepare an outline based on the main concept and a few subordinate ideas, and list resource materials that will support this information. Organize the presentation into the introduction (about 15 percent of allotted time), the main body (about 75 percent), and the conclusion (the remaining 10 percent). The conclusion should restate the main concept.

Structure

Keep viewgraphs and slides simple. Use key words and a consistent style. Place only one major point and a maximum of six subordinate points in each viewgraph. Limit each viewgraph to 25 words or less (excluding title). If a major point requires more than 25 words, use more than one viewgraph to make that point. Keep titles short and meaningful. Use graphics to illustrate complex ideas in simple form (e.g., bar charts and photographs).

Word Selection

Use concrete words to explain facts and procedures in terms the audience will understand. Divide processes into small steps. Write with nouns and verbs to strengthen meaning; do not use unnecessary adjectives and adverbs. Write direct instructions (e.g., "analyze data" not "data will be analyzed"). Choose simple, exact words (e.g., "many" rather than "appreciable" and "use" rather than "utilize"). Use active verbs in the present tense (e.g., "disconnect cable" not "cable is disconnected"). Avoid laboratory jargon.

Practice

Once the viewgraphs have been written, read them aloud. If the words do not flow easily, take the time to revise. Finally, practice. Read the presentation aloud in front of a mirror, deliver it to knowledgeable colleagues, or use a tape recorder or camcorder.

VIEWGRAPH AND SLIDE STANDARDS

The Visual Information Branch has established specific standards and guidelines for the graphics products generated for the various categories of publications produced by NUWC Division Newport. The standards for illustrations to be incorporated in technical reports, documents, or memoranda are outlined in section 3 of this guide. The following standards apply to all viewgraphs and slides.

Image Area

A viewgraph's image area is approximately 6 by 8.5 inches (15 by 21.5 cm). The orientation should be horizontal and there should be a 3/4-inch (1.9-cm) space available below the image area to accommodate an alphanumeric code, Julian date (optional), and security markings if classified (see figure 7-1). If the viewgraph is SECRET, a 7/8-inch (2.2-cm) allowance along the right edge is necessary for the placement of a bar code with a SECRET control number (see figure 7-2).

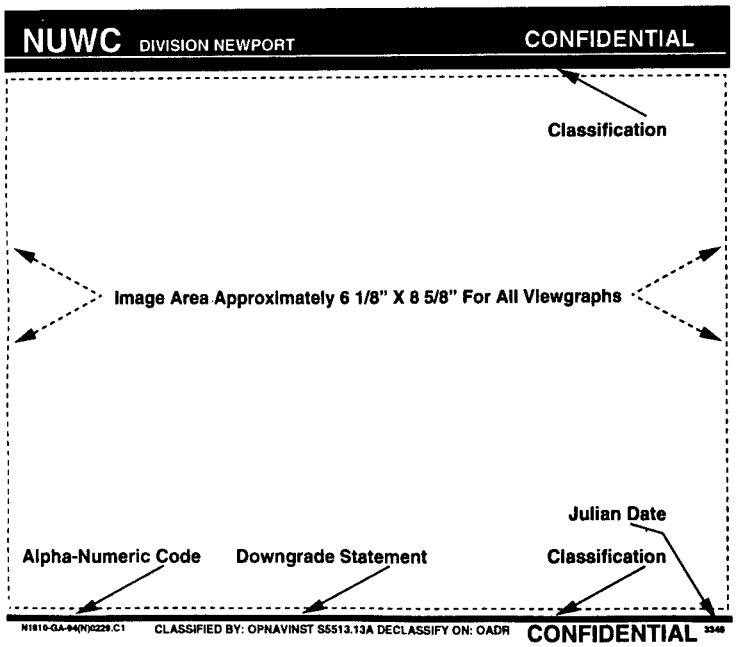

Figure 7-1. Sample Classified Viewgraph
(Sample information is Unclassified.)

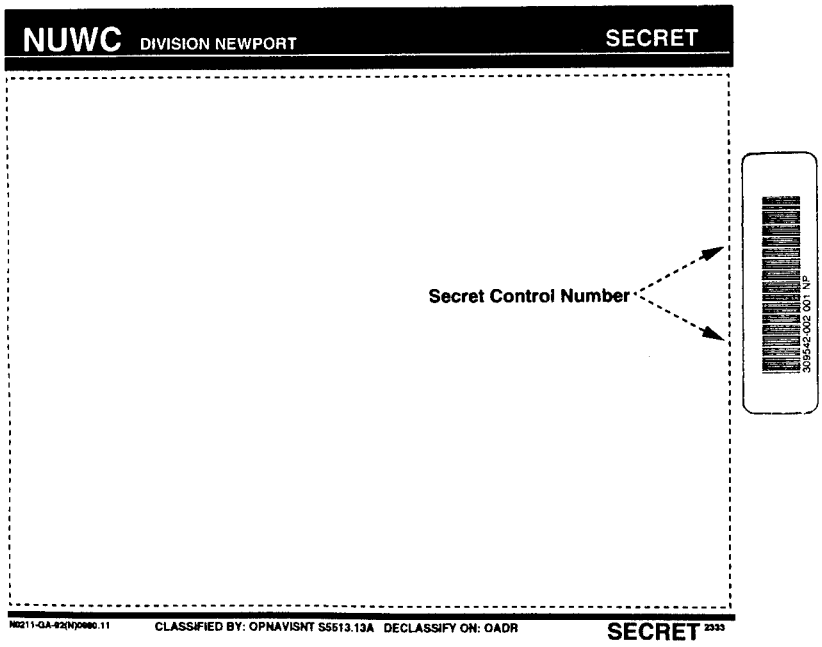

Figure 7-2. Sample Viewgraph Displaying Secret Control Number

Alphanumeric Code

An alphanumeric code is the viewgraph accession number, necessary for Visual Information Branch file management. A number is assigned by the Branch and placed at the bottom of the image area. If the material is prepared outside the Visual Information Branch, it can still be placed on file for future use. Visual Information Branch personnel can provide an accession number and guidelines for the placement of the alphanumeric code.

Typeface

A bold sans serif typeface (e.g., Helvetica, Helios, or Swiss Bold), in all capital letters, is used to typeset the text or nomenclature for viewgraphs. The use of black lettering on a clear background for all word viewgraphs is preferred. However, functional use of color and color for emphasis or clarity is permissible when necessary.

Titles

Titles should be 5.8 to 8.4 mm (24 to 30 points) high. A single line is preferred and should be centered at the top of the image area (see figure 7-3).

Text

Text should be 3.4 to 4.5 mm (14 to 18 points) high. Main points are normally preceded by bullets; subordinate points are normally preceded by dashes (see figure 7-3). The originator is responsible for the content and review.

Nomenclature

Nomenclature on graphs, drawings, and block diagrams should be no less than 3 mm (12 points) high (see figure 7-4).

Classified Viewgraphs

The accuracy of all security markings on viewgraphs is the responsibility of the originator. For classified viewgraphs, 5-mm (24-point) Helvetica bold (or equivalent) capitalized letters are used to mark the security classification in the upper right corner of the logo band and below the image area to the left of the Julian date (see figure 7-1). The security classification of the title must be indicated in parentheses following the title (see figure 7-3).

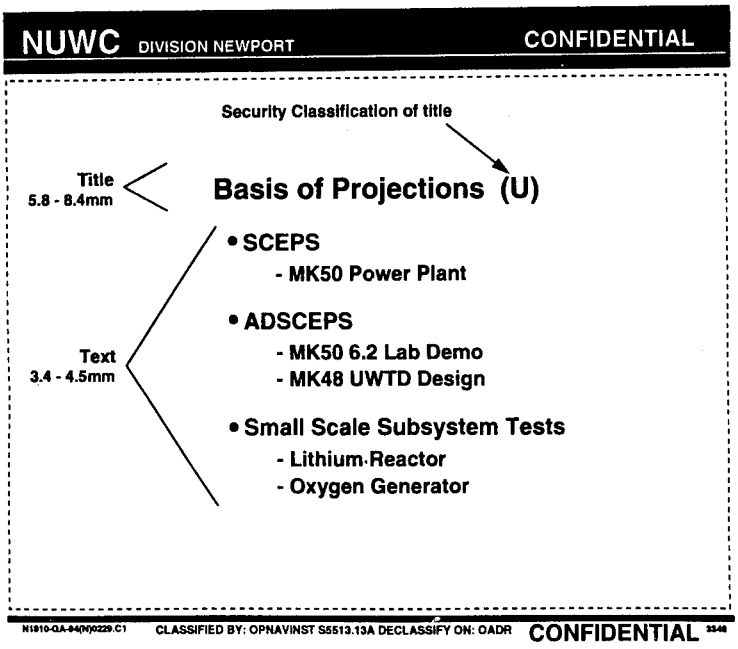

Figure 7-3. Viewgraph Title Specifications
(Sample information is Unclassified.)

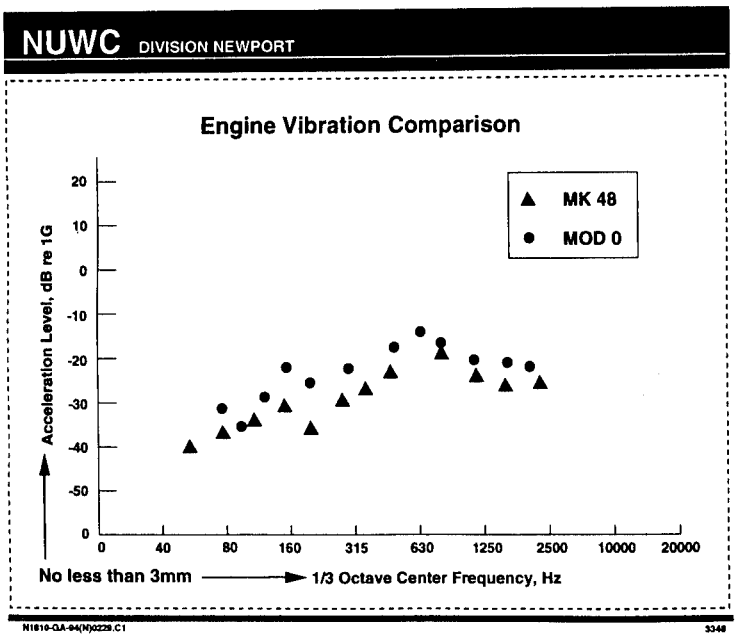

Figure 7-4. Standard Viewgraph Nomenclature

Also, in accordance with security regulations, NUWCDIV-NPTINST 5500.4, each classified viewgraph must be marked with the applicable downgrading statement and declassification date at the bottom of the image area, just to the right of the alphanumeric code (see figures 7-1, 7-2, and 7-3). Following is an example:

CLASSIFIED BY: OPNAVINST S5513.5B-44 DECLASSIFY ON: OADR

The abbreviation OADR (originating agency's determination required) is appropriate when no specific date for declassification can be assigned.

All SECRET viewgraphs must carry a bar code with a SECRET control number assigned and placed on the page by the NUWC Division Newport Library. The bar code will be placed on the right edge of the viewgraph and should not affect the image area (see figure 7-2).

Photographs

Photographs can also be incorporated into viewgraphs. The photographs should have a title, an alphanumeric or photo file number, and security markings, if classified. The title and identification are placed at the top and/or bottom of the photograph. The lettering may be either black on a white background or white on a black background, depending on the tonal values of the photograph. Security markings and file numbers are in the same relative position as on other viewgraphs (see figure 7-5).

NUWC Logo

An individual may create a special project or program logo, or have a contractor create or design a logo. The following measurements are provided to ensure that all viewgraphs meet the NUWC Division Newport criteria (see figure 7-6):

1. The logo band or bar is approximately 11/16 inch (1.8 cm) wide and 9 1/8 inches (24.1 cm) long.
2. There is a line located 1/8 inch (0.32 cm) from the bottom of the band. This line is 1/32 inch (0.08 cm) thick and runs the length of the bar.

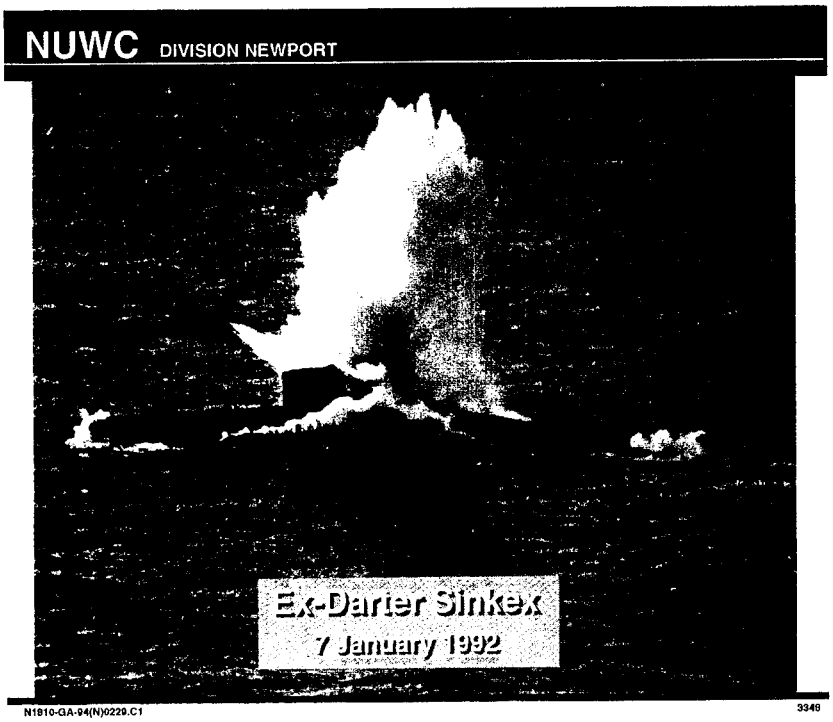

Figure 7-5. Typical Viewgraph Containing a Photograph

3. The acronym NUWC is located 1/16 inch (0.16 cm) above the line and 3/16 inch (0.48 cm) from the left end of the band. The letters should be all capitals, Helvetica bold, 7 mm (30 points) high.

4. DIVISION NEWPORT immediately follows NUWC, but is 3.5 mm (14 points) high, all capitals, Helvetica bold. (NOTE: Center Headquarters does not identify itself with any one division and, therefore, uses just NUWC.)

An effective presentation is more than a collection of viewgraphs. Viewgraphs should punctuate the main message, not carry its weight alone. To make a lasting impression on the audience, organize the presentation in a logical flow of ideas that the audience can follow. Use the viewgraphs to add emphasis to the most important points.

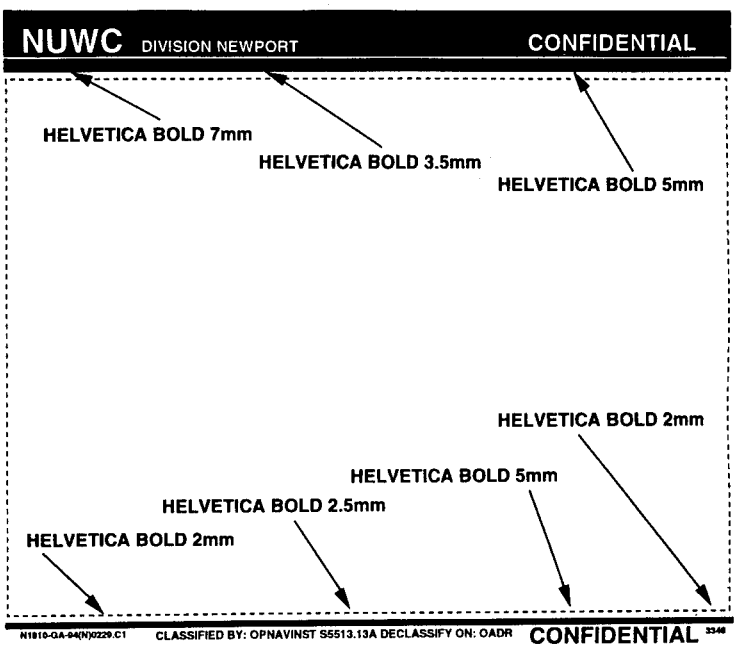

Figure 7-6. Standard Viewgraph Measurements
(Sample information is Unclassified.)

TECHNICAL PRESENTATION REPORT

Presentation graphics are generally prepared for a sponsor review, department review, conference, or symposium. In any event, after such a presentation, a presentation graphics package may be compiled into an informal technical presentation report, which is a convenient way to document the meeting, conference, etc.

The Visual Information Branch will prepare the package and attach an informal report cover. Such informal reports have no ID number and are not entered into the library system. If the presentation report is to be entered into the library system, it must be published as a technical document or a reprint report (see section 3).

8. SUPPLEMENTAL INFORMATION

The following tables are supplemental lists to the publications and presentations guide.

The abbreviation list (table 8-1) contains the preferred abbreviations for many of the units of measurement used in NUWC Division Newport technical publications (except in technical manuals where preferred abbreviations are found in MIL-STD-12D and ANSI Y10.19). Department of Defense (DoD) policy states that metric units be included in addition to, or instead of, U.S. customary units in all technical reports, studies, and position papers. Exceptions to this requirement must be approved by the author's department head. The International System of Units described in ASTM E380-82 (ANSI Z210.1) or successor documents listed in the *DoD Index of Specifications and Standards* is the metric system to be used. Other details of the metric policy may be found in section 1 of this guide.

The abbreviations in this list follow the standard ASTM E380-82. For U.S. customary units, the equivalent metric unit and its abbreviation are given in parentheses:

foot (meter) ft (m)

Each abbreviation denotes both the singular and the plural form. In a complete expression for a quantity, a space should be allowed between the numerical value and the unit symbol. Once an abbreviation (or acronym*) is introduced in the text, it should be used consistently throughout the document.

Table 8-2 contains the preferred capitalization, compounding, and spelling for many words and phrases used in technical publications. The preferred spelling is generally that recommended by the *Government Printing Office (GPO) Style Manual.* For the preferred capitalization or compounding, the *GPO Style Manual* has been the guide; however, the general trends and preferences observed in recognized scientific and literary sources have been taken into consideration. In this list, an abbreviation indicates the part of

*See *Acronyms, Initialisms, and Ship Designators: A Selected List*, Fourth Edition (NUWC-NPT Technical Document 10,601), for a complete listing.

speech to which the entry pertains. For example, *above-water (u.m.)* means that the words *above* and *water* are used together as a unit modifier (e.g., the above-water target). The notation *(all)* after an entry means that the given entry is used the same way in all other forms of the word regardless of the part of speech.

Table 8-3 contains a useful metric conversion table. Table 8-4 lists common proofreader's marks.

Table 8-1. Abbreviations for Units of Measurement

Term	Abbreviation
alternating current	ac
ampere	A
ampere-hour (coulomb)	A-hr (C)
ampere meter squared	$A \cdot m^2$
ampere per meter	A/m
ampere-turn	At
angstrom (meter)	Å (m)
atmosphere, normal	atm
atmosphere (technical) 1 kgf/cm^2 (pascal)	at. (Pa)
bar (pascal)	bar (Pa)
bel	B
bits per second	b/sec or b/s
British thermal unit (joule)	Btu (J)
candela	cd
candela per square meter	cd/m^2
centimeter	cm
centimeter-gram-second	cgs
coulomb	C
cubic centimeter, liquid	cc
cubic centimeter, volume	cm^3
cubic foot (cubic meter)	ft^3 (m^3)
cubic inch (cubic centimeter)	$in.^3$ (cm^3)
cubic yard (cubic meter)	yd^3 (m^3)
decibel	dB
decibel spectrum	dBs
decibel referred to one micropascal	dB//1 μPa

Table 8-1. Abbreviations for Units of Measurement (Cont'd)

Term	Abbreviation
decibel referred to one milliwatt	dBm
decibel referred to one volt	dBV
decibel relative to one gause	dBG
degree, plane angle (radian)	deg or ° (rad)
degree, temperature	
10 to 20 degrees Celsius	10 to 20°C
10 degrees Fahrenheit (10 degrees Celsius)	10°F (10°C)
10 degrees Celsius plus or minus 5 degrees	10°C ± 5°
direct current	dc
direct current volts	Vdc
direct current working volts	Vdcw
dyne (newton)	dyn (N)
farad	F
fathom (meter)	fm (m)
foot (meter)	ft (m)
footcandle (lumen per square meter)	fc (lm/m^2)
footlambert (candela per square meter) (lux)	fL (cd/m^2) (lx)
foot per minute (meter per second)	ft/min (m/sec or m/s)
foot per second (meter per second)	ft/sec (m/sec or m/s)
foot-poundal (joule)	ft-pdl (J)
foot-pound-force (joule)	ft • lbf (J)
foot-pound per second	ft-lb/sec or ft-lb/s
gallons per minute (cubic meters per second)	gal/min (m^3/sec or m^3/s)
gauss (tesla)	G (T)
gigahertz	GHz
gram	g

Table 8-1. Abbreviations for Units of Measurement (Cont'd)

Term	Abbreviation
gravitational acceleration	g (plural: g's)
henry	H
Hertz	Hz
horsepower	hp
hour	hr
inch (millimeter)	in. (mm)
inch per second (millimeter per second)	in./sec (mm/sec) or in./s (mm/s)
joule	J
joule per kelvin	J/K
kelvin	K
kilogauss	kG
kilogram	kg
kilogram-force	kgf
kilohertz	kHz
kilohm	kΩ
kilometer	km
kiloton	kt
kilovolt	kV
kilowatt	kW
kilowatt-hour	kW-hr
kiloyard (kilometer)	kyd (km)
knot	Spell out
kilonewton	kN
lambert	L
liter	l
lumen per square meter	lm/m^2

Table 8-1. Abbreviations for Units of Measurement (Cont'd)

Term	Abbreviation
lux	lx
megahertz	MHz
meganewton	MN
megavolt	MV
megawatt	MW
megohm	mΩ
meter-kilogram-second	mks
meter per second	m/sec or m/s
mho (siemens)	mho (S)
mho per meter (siemens per meter)	mho/m (S/m)
microampere	μA
micron (meter)	μ (m)
micropascal	μPa
microsecond	μsec or μs
microwatt	μW
mil	mil (1 mil = 0.001 in.)
mile (kilometer)	mile (km)
milliampere	mA
milligram	mg
millihenry	mH
millihertz	mHz
millimeter	mm
conventional millimeter of mercury	mmHg
millimeter per second	mm/sec or mm/s
millivolt	mV
milliwatt	mW

Table 8-1. Abbreviations for Units of Measurement (Cont'd)

Term	Abbreviation
minute (time)	min
month	Spell out
nanometer	nm
nanosecond	nsec or ns
nautical mile (kilometer)	nmi (km)
neper	Np
newton	N
newton per meter	N/m
oersted	oe
ohm	Spell out in text; Ω in figures, tables
parts per million	ppm
parts per thousand, salinity	ppt or ‰
pascal	Pa
percent	Spell out in text; % in figures, tables
picofarad	pF
pound (kilogram)	lb (kg)
poundal (newton)	pdl (N)
pound-force (newton)	lbf (N)
pound-force per square inch (pascal)	lbf/in.^{2} (Pa)
pound per square inch	See pound-force per square inch
radian	rad
revolution per minute	rpm
second	sec or s

Table 8-1. Abbreviations for Units of Measurement (Cont'd)

Term	Abbreviation
siemens	S
siemens per meter	S/m
square foot (square meter)	ft^2 (m^2)
square inch (square millimeter)	$in.^2$ (mm^2)
square meter	m^2
square yard (square meter)	yd^2 (m^2)
steradian	sr
tesla	T
volt	V
voltampere	VA
watt	W
watt-hour	W-hr
yard	yd (m)

Table 8-2. Preferred Capitalization, Compounding, and Spelling

aboveboard
abovedeck
above-water (u.m.)
abscissas
A-cable
acidproof
acknowledgment
active-passive (u.m.)
Ada
adapter (not adaptor)
addendum, addenda
adiabatic
aerospace
A-frame
afterbody
airblast (n.)
air-blasted (v., u.m.)
airblown
airborne
air-condition (all)
air-cool (v., u.m.)
air-drop (v., u.m.)
air-dry (v., u.m.)
air duct
airflask
airflow
air line (tube)
airtight
airwave
align(ment)
Allen wrench
all ready
already
analog-to-digital (u.m.)
antennas
anti (as prefix, generally forms one word)
antiair (warfare)
antialias
antiflashback
antifreeze
antilogarithm
antiseize
antisubmarine (warfare)
antisurface ship (warfare)
any time
aperture
apex, apexes
appendix, appendixes
a priori
arctic (descriptive adjective)
Arctic
asymmetry
at-sea

Table 8-2. Preferred Capitalization, Compounding, and Spelling (Cont'd)

audio frequency	breakaway (n., u.m.)
audio-visual	broadband
autocorrelation	buzzword
axisymmetric	bypass
backfit (all)	byproduct
backlight	callout (n., u.m.)
backscatter	canceled
bandpass (v., u.m.)	cancellation
bandwidth	capacitance
baseline	capscrew
beamformer	Caribbean
beam pattern	catalog
beamwidth	cathode-ray oscilloscope
bearings-only	cathode-ray tube
beat-frequency oscillator	Celluloid (trademark)
bellmouth	centerline
benchboard	cesium
benefited	checklist
biannual	checkoff (n., u.m.)
biweekly	checkout (n., u.m.)
blowoff (n., u.m.)	circuit breaker
borderline	clamp-ring segments
bottom-bounce (u.m.)	clear-cut (u.m.)
bottom-reflected (u.m.)	clockwise
bottomside	closed-circuit (u.m.)
bottomside-up	close-in attack
bottom-up (u.m.)	closeup (n., u.m.)
breadboard(ed)	coaxial

Table 8-2. Preferred Capitalization, Compounding, and Spelling (Cont'd)

coexist	crosscoupling
collinear	crossflow
concomitant	crosshair
condensable	crosshatched
cone-shaped (u.m.)	crosshead
consistent	cross-index (all)
continual	crossover (n., u.m.)
continuous	cross product (n.)
contrarotating	cross range (n.)
controllable	cross-range (u.m.)
controlled	cross ranging (n.)
controller	cross-ranging (u.m.)
controlling	cross-reference (all)
convergence zone	cross section (n.)
cooldown	cross-section (u.m., v.)
correlogram	cross-sectional (u. m.)
cost-cutting	cross-slotted
cotter pin	cross-spectral (u.m.)
counterclockwise	crosstalk (n., u.m.)
countermeasure	cross term (n.)
counterrotating	crosswise
countersink	cuing
countertorque	cumulant
crisscross (all)	cutaway (n., u.m.)
criterion, criteria	cutback (n., u.m.)
cross brace (n.)	cutoff (n., u.m.)
cross-check (all)	cutout (n., u.m.)
crosscorrelation (all)	damped-acoustic (u.m.)

Table 8-2. Preferred Capitalization, Compounding, and Spelling (Cont'd)

dampproof (all)	double-ended (u.m.)
database	downgrade (all)
data flow	downlink (all)
dateline	download (all)
datum, data	down points
Day-Glo	downstream (all)
daylight	downtime
deadline	downward
deadweight (n., u.m.)	drawback (n., u.m.)
decision-maker	drip-dry (all)
decision-making	drive shaft
deenergize	dropout (n., u.m.)
deep-freeze (v., u.m.)	dry-cell (u.m.)
deep scattering layer	dryclean (all)
deep-sea (u.m.)	drydock (all)
de-ice	dustproof (all)
desiccate	dusttight
desktop (u.m.)	easternmost
determinant	echo-range (all)
diabatic	eigenfunction
discrete	eigenvalue
discretize	eiger ray
discretization	electroacoustics
disk	electromagnetic(s)
disk-shaped (u.m.)	electromechanical
dockside	electro-optics
dome-shaped (u.m.)	electrostatic
Doppler	embed

Table 8-2. Preferred Capitalization, Compounding, and Spelling (Cont'd)

emittance (optics)
emplantment
encase
endcap
endfire
end-item
endpiece
endplay
endproduct
end-user
en route
ensure (not insure)
Ethernet
even-numbered (u.m.)
every time
exceedance
exercise head
expendable
EX-SALMON
(decommissioned ship)
extendible
EX-21 (experimental version
of hardware)
eyebolt
eyepiece
facedown (u.m.)
faceup (u.m.)
farfield
farther
feedback (n., u.m.)
ferroelectric
ferrous
fiberboard
Fiberglass (trademark)
fiberglass (generic)
fiber optics
fiber-optic (u.m.)
figure of merit
fingertight
fireproof (all)
fire-resistant (u.m.)
firesafe
fire-test (v., u.m.)
firsthand (u.m.)
Fishers Island
fishtail
flameproof (all)
flathead screws
fleet (but U. S. Fleet)
flextensional transducer
flip-flop (u.m.)
flotation
flowchart
flowfield
flow loop
flowmeter

Table 8-2. Preferred Capitalization, Compounding, and Spelling (Cont'd)

flow rate	gases
fluorescein	gastight
fluorescent	gauge
foldout (n., u.m.)	gauss
follow-on (n., u.m.)	Gaussian
followup (n., u.m.)	Gauss' law
fore-and-aft (n., u.m.)	gearbox
forklift	gearcase
formatted	geartrain
Formica (trademark)	gel
formulas	getaway (n., u.m.)
FORTRAN	gray
forwardmost	greaseproof (all)
Fourier	gridline
freeboard	ground truth
freehand (u.m.)	groundwork
freestanding (u.m.)	guideline
freestream (u.m.)	gyrocompass
Freon (trademark)	half hitch
frequency-shift keying	half hour (n.)
front-end (u.m.)	half-strength (u.m.)
full-scale (u.m.)	halfway
full-speed (u.m.)	handbrake
full-strength (u.m.)	hand-carry (v.)
further	handcrank
fuseblock	handhold
FY 1994 (in text)	handhole
FY 94 (in figures and tables)	handpump

Table 8-2. Preferred Capitalization, Compounding, and Spelling (Cont'd)

handtight (all)
handtool
hand-tooled (v., u.m.)
handwheel
hard copy (n.)
hard-copy (u.m.)
hard-over (u.m.)
Harpoon (missile)
hatchway
heatproof (all)
heat pump
heat-resistant (u.m.)
heattreat (v., u.m.)
heat-treated (u.m.)
heavy-duty (u.m.)
Helmholtz
helix, helices
henry, henrys
heuristically
high-fidelity
high-frequency (u.m.)
high-level (u.m.)
highlight (all)
highpass (u.m.)
high-pressure (u.m.)
high-speed (u.m.)
high-voltage (u.m.)
histogram
holddown clamps
holdover (n., u.m.)
hookup (n., u.m.)
horsepower
hull-mounted (u.m.)
hydrodynamic
I-bar
I-beam
ice camp
in-and-out motion
inboard
inch-long (u.m.)
in-depth (u.m.)
index, indexes
infrared
infrasonic
in-house
inline (computer terminology)
input (present and past tense)
insonification
insonify
in situ
inter alia
in vacuo
in-water
isotropic
i^{th} or i-th

Table 8-2. Preferred Capitalization, Compounding, and Spelling (Cont'd)

jackscrew
judgment
jury-rig (v., u. m.)
Kevlar
keyboard (all)
keypunch (all)
knife-edge bearing
land-based (u.m.)
landfall (n. u.m.)
landmass
large-scale (u.m.)
laser
leak meter
least-squares (u.m.)
left-hand (u.m.)
leftmost
letterhead
liaison
life-cycle (u.m.)
lightweight (n., u.m.)
line of sight (n)
line-of-sight (u.m.)
lineup (n., u.m.)
linkup (n., u.m.)
Lithocon
live wire
locknut
lockscrew
lockwasher
locus, loci
Lofargram
long-handled (u.m.)
long-range (u.m.)
long-term (u.m.)
lookup (n., u.m.)
loudspeaker
lowercase
lowermost
low-frequency (u.m.)
low-level (u.m.)
lowpass (u.m.)
low-pressure (u.m.)
low-speed (u.m.)
low-voltage (all)
mainlobe
mainspring
makeup (n., u.m.)
manageable
man-hour
man-year
maser
matrix, matrices
mean flow
memorandum, memoranda
metal-coated (u.m.)
microampere

Table 8-2. Preferred Capitalization, Compounding, and Spelling (Cont'd)

microswitch
mid (as prefix, generally forms one word)
mid-1970s
midchannel
midfrequency
midlatitude
midpoint
midsection
midtest
milestone
minelayer
minesweeper
mini (as prefix, generally forms one word)
minicomputer
mismatch
modeled
modeler
modeling
moistureproof (all)
Monel (trademark)
monthlong (u.m.)
motor generator
movable
multi (as prefix, generally forms one word)
multilayered
multimeter
multipurpose
nameplate
narrowband (u.m.)
naval
Navy (U.S.)
Navy-wide
nearby
nearfield
near-miss (n., u.m.)
noise-limited (u.m.)
non (as prefix, generally forms one word)
nonacoustic
noncavitating
noncircular
nondirectional
non-Gaussian
noninterchangeable
nonnuclear
nonstationary
nontoxic
nonuniform
nonwire-guided (u.m.)
nonzero
northeast (u.m.)
nosedive (all)
nosedown (adv., u.m.)

Table 8-2. Preferred Capitalization, Compounding, and Spelling (Cont'd)

nosepiece
noticeable
n^{th} or n-th
oersted
off-and-on (u.m.)
off-balance (all)
off-center (all)
offline
offload (all)
offshore
oiltight
omnidirectional
on board (adv.)
onboard (u.m.)
one-piece (u.m.)
ongoing (u.m.)
online
onload (all)
onshore (u.m.)
on shore (adv.)
on-site (u.m.)
or-ed
ORDALT
ordnance alteration
O-ring
or-ing
Otto fuel
outboard
output
overall (all)
overestimate
overflow
overhaul
overrun (all)
overshoot
overspeed
overswing
own ship (all)
padlock
parameter
parametrize
Pascal (computer language)
pascal (unit of pressure)
passband
pay (-ed) out (v.)
peacetime
Pend Oreille
percent
petcock
pH
Ph.D.
phenomenon, phenomena
Philips screw (trademark)
photocell
pickoff (n., u.m.)
pickup (n., u.m.)

Table 8-2. Preferred Capitalization, Compounding, and Spelling (Cont'd)

piecewise
piezoelectric
pilothouse
pinpoint
Pitot tube
playback (n., u.m.)
Plexiglas (trademark)
plug-in (u.m.)
post (as prefix, generally forms one word)
postamplifier
postlaunch
postrun
posttest
power plant
powerport
powerpack
pre (as prefix, generally forms one word)
preamplifier
pre-enable
pre-exercise
prelandfall
prelaunch
preprogrammed
preset
pressureproof (all)
pressuretight (u.m.)
prestarting
pretest
principal (chief)
principle (rule)
printout (n., u.m.)
problem-solving (n., u.m.)
processor
program
programmable
programmed
programmer
programming
pseudo (as prefix, generally forms one word)
pseudoclassification
pseudoeigenfunction
pseudorandom
pullaround
pullback (n., u.m.)
pulldown (n., u.m.)
pull-in (n., u.m.)
pull-on (n., u.m.)
pullout (n., u.m.)
pulse width
pushbutton
push-pull (u.m.)
Pyrex (trademark)
quadrupole

Table 8-2. Preferred Capitalization, Compounding, and Spelling (Cont'd)

quantization
quantized
quantizing
quasi- (as prefix, generally hyphenated)
quasi-impulsive noise
quasi-stationary
quick-charging (u.m.)
radioactive
radius, radii
ray path (n.)
ray-path (u.m.)
readback
readout (n., u.m.)
real time (n.)
real-time (u.m.)
reattack
recheck
recordkeeping (n., u.m.)
reenergize
reenter
reexamine
reinforce
reinitialize
reinstall
reseat
rescribe
reset
resistivity
retest
reverberation-limited (u.m.)
reversible
reweld
Reynolds number
right-angle (u.m.)
right-hand (u.m.)
rightmost
root-mean-square (all)
round-trip (u.m.)
rundown
runoff (n., u.m.)
runtime (n., u.m.)
rustproof (all)
salt water (n.)
saltwater (u.m.)
sandblast
screenout (n., u.m.)
screwdriver
screwhook
screwplug
sea base
sea-based (u.m.)
seabed
seacoast

Table 8-2. Preferred Capitalization, Compounding, and Spelling (Cont'd)

sea level
searchlight
sea water (all)
Seawolf (SSN 21)
self- (as reflexive, use hyphen, e.g., self-noise)
semi (as prefix, generally forms one word)
semiannually
semicircle
semiconductor
semiempirical
semi-infinite
servoamplifier
servobrake
servocircuit
servocontrol
servomechanism
servomotor
servosystem
setscrew
setup (n., u.m.)
shallow-draft (u.m.)
sharp-angled (u.m.)
sharp-edged (u.m.)
sheet metal
shelf life
SHIPALT
shipboard
shipborne
shipyard
shore-based(u.m.)
short circuit (n.)
short-circuit (v., u.m.)
short range (n.)
short-range (u.m.)
shutdown (n., u.m.)
shutoff (n., u.m.)
sideband
sidelobe (all)
silver-plated (u.m.)
signal-to-noise ratio
sine curve
sine wave
single-phase (u.m.)
sinusoidal
sizable
slide rule
slipknot
slip-on (n., u.m.)
slipproof
slipring
snaphook
snaplock
snap-on (n., u.m.)
snapring

Table 8-2. Preferred Capitalization, Compounding, and Spelling (Cont'd)

solid-state (u.m.)
sonobuoy
sound wave
spatial (not spacial)
spherocylindrical
spot-check (v., u.m.)
spot weld
spot-weld (v., u.m.)
spring-load (v., u.m.)
square-edge
SSN 688 class
SSN 688 class submarine
SSN 688 submarine
stand-alone (u.m.)
standby (n., u.m.)
standing-wave ratio
standoff (n., u.m.)
startup (n., u.m.)
stationary
step-by-step (u.m.)
stepdown (n., u.m.)
stepwise
stepup (n., u.m.)
stochastic
stockpile (all)
stopgap
stopwatch
straightaway (all)
straightedge (all)
straightforward (u.m.)
straight-line (u.m.)
streamline (all)
structureborne
Styrofoam (trademark)
sub (as prefix, generally forms one word)
subassembly
subcase
subproject
subsection
subsonic
superbuoyant
superhigh
supersede
supersonic
swimbladder
swimout (n., u.m.)
swing bolt
switchboard
switchbox
switchgear
synchro-transmitter
systemwide (u.m.)
tailcone
tailormade (u.m.)
tailpiece

Table 8-2. Preferred Capitalization, Compounding, and Spelling (Cont'd)

tailstock
takeoff (n., u.m.)
takeup (n., u.m.)
task force
teamwork
tearproof (all)
Teflon (trademark)
test bed
test case
three-dimensional (u.m.)
throughout
thrustpower
tieback (n.)
tiedown (n., u.m.)
tie-in (n., u.m.)
tieline
tie rod
tiltboard
tilt table
time clock
time-consuming (u.m.)
time delay (n.)
time-delay (u.m.)
timeframe
time-late (n., u.m.)
times-late (n. pl.)
timeline
time-of-fire (all)
timesaving (u.m.)
timestudy
timetable
Tomahawk
top-down (u.m.)
topside
torpedoborne
touchup (n., u.m.)
towcable
towed array
towline
towpoint (n., u.m.)
trademark
trade name
tradeoff (n., u.m.)
transistor (not transister)
transmittance
transversity
traveled
traveler
traveling
traveltime
Trident
trouble-free (u.m.)
troubleshoot (all)
T-shaped (u.m.)
T-square
tube-launched (u.m.)

Table 8-2. Preferred Capitalization, Compounding, and Spelling (Cont'd)

tunneling
turnaround (n., u.m.)
turntable
twofold
two-piece (u.m.)
two-way (u.m.)
ultra (as prefix, generally forms one word)
ultrahigh frequency
ultrasonic
ultraviolet
underice (u.m.)
underwater (u.m.)
under water (adv.)
under way (adv.)
underway (u.m.)
Univac (trademark)
update (all)
upend (v.)
upgrade (all)
uplink (all)
uppercase
upside-down (u.m.)
upside down (adv.)
uptake
up-to-date (u.m.)
upwind
usable
user-friendly (u.m.)
user's guide
U-shaped (u.m.)
vaporproof
vaportight
variable depth sonar
variable frequency multiplier
venthole
videodisk (or videodisc)
viewgraph (not vugraph)
viscous
voltage standing-wave ratio
voltmeter
von Mises' intensity
vortices
walk-through
warhead
warmup (n., u.m.)
war shot (u.m.)
waterborne
water-cooled (u.m.)
water-filled (u.m.)
water-inlet plug
water level
waterline
waterproof (all)
watertight
waveform

Table 8-2. Preferred Capitalization, Compounding, and Spelling (Cont'd)

wavefront	workplace
wave function	workstation
waveguide	work-year
waveheight	worldwide
wavelength	worm gear
wavenumber	worm wheel
waveshape	worthwhile
wavevector	wrench-tight(en) (all)
way point	x-axis
wayward	x-direction
weatherproof (all)	xerography
wedge-shaped (u.m.)	X-ray
wedge-type joint	x-y plane
weeklong (u.m.)	x,y,z coordinate system
wherever	y-axis
wide-angle (u.m.)	y-direction
wide band (n.)	Y-pipe
wide-open (u.m.)	yearend
wind tunnel	yearlong (u.m.)
windspeed	year-round
wingbolt	z-axis
wire guidance	zeros
wire-guided (u.m.)	zeroth
wireway	zigzag

Table 8-3. Common Metric Conversions

To Convert From	To	Multiply By
acre	square meter	4046.873
ampere hour	coulomb	3600.000
degree (angle)	radian	0.01745329
fathom	meter	1.8288
fluid ounce (U.S.)	cubic meter	0.00002957353
foot (U.S.)	meter	0.3048006
ft^2	square meter	0.09290304
ft/sec	meters per second	0.3048000
ft-lb	joule	1.355818
gallon (U.S. dry)	cubic meter	0.004404884
gallon (U.S. liquid)	cubic meter	0.003785412
gallon (U.S. liquid)	liter	3.785306
gauss	tesla	0.0001
gram	kilogram	0.001
hectare	square meter	10000.000
inch	meter	0.0254000
$in.^2$	square meter	0.00064516
kilogram-force (kgf)	newton	9.806650
knot	meter per second	0.5144444
$lb/in.^2$ (psi)	pascal	6894.757
liter	cubic meter	0.001
micron	meter	0.000001
mil	meter	0.0000254
mile (U.S.)	meter	1609.347
mile (U.S. nautical)	meter	1852.000
miles per hour	meters per second	0.44704
minute (angle)	radian	0.0002908
ohm centimeter	ohm meter	0.01
pound-force	newton	4.448222
quart (U.S. dry)	cubic meter	0.001101221
quart (U.S. liquid)	cubic meter	0.000946352
second (angle)	radian	0.000004848
ton (metric)	kilogram	1000.000
yard	meter	0.9144

Table 8-4. Common Proofreader's Marks

Mark	Meaning	Mark	Meaning
⊙	Insert period	l.c.	Lower case, used in margin
⋀	Insert comma	/	Delete or substitute, used in text
;	Insert semicolon		
:	Insert colon	⌒	Close up
?	Insert question mark	⌒	Delete
!	Insert exclamation mark	⌒	Close up and delete
=/	Insert hyphen	w.f.	Wrong font
⋁	Insert apostrophe	⊐	Move right
⋁⋁	Insert quotation marks	⊏	Move left
#	Insert space	⊓	Move up
ld>	Insert lead between lines	⊔	Move down
∨	Superior	‖	Align vertically
∧	Inferior	—	Align horizontally
(/)	Parentheses	⊐⊏	Center horizontally
[/]	Brackets	⊔⊓	Center vertically
¶	Paragraph	eq.#	Equalize space, used in margin
no ¶	No paragraph		
tr	Transpose, used in margin	⋁⋁⋁	Equalize space, used in text
∩	Transpose, used in text	stet.	Let it stand, used in margin
sp	Spell out	·····	Let it stand, used in text
ital	Italic, used in margin	⊗	Dirty or broken letter
——	Italic, used in text	run over	Carry over to next line
b.f.	Boldface, used in margin	run back	Carry back to preceding line
~~	Boldface, used in text	out, see copy	Something omitted, see copy
caps.	Capitals, used in margin	ⓘ	Question to author
≡	Capitals, used in text	∧	Caret, used to mark exact position of error in text

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